Cromford Canal
Report on Preliminary Scoping and Options Study

Derbyshire County Council

27 January 2012

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Document History

Job number: 5099944			**Document ref: Scoping Study r3-1.doc**			
Revision	**Purpose Description**	**Originated**	**Checked**	**Reviewed**	**Authorised**	**Date**
Rev 1.0	Draft for discussion	JAT/PM	DF	DF	DF	11/05/11
Rev 2.0	Second draft – to DCC for comment	PM	JAT	DF	DF	11/09/11
Rev 2.1	Amended second draft	PM	JAT	DF	DF	19/09/11
Rev 2.2	Second draft – incorporating Partners' comments	PM	JAT	DF	DF	08/11/11
Rev 3.0	Third draft – interim issue	PM	JAT	DF	DF	10/11/11
Rev 3.1	Final draft	PM	JAT	DF	DF	27/01/12

This document incorporates text previously issued as "Cromford Canal Scoping Study – Resource Statement: Draft for Discussion" Rev 1.0 on 18/02/2011.

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Introduction

This report details the findings of the Cromford Canal Scoping Study undertaken by Atkins between 2010 and 2012.

The study area comprises the Cromford Canal from Langley Mill to Cromford and the Pinxton Arm of the Canal.

The report is in two parts: the first is a Statement of Resource which identifies the engineering, heritage and environmental resources remaining along the corridor of the former canal and gives an assessment of the character of each section of the canal.

The second section is an Options Appraisal which assesses options for future management and development of the canal and gives outlines of the costs and benefits for each option.

Executive Summary

Atkins was engaged by Derbyshire County Council on behalf of the Cromford Canal Consortium to undertake a study which would:

- Establish the current condition of the heritage, ecological and environmental resources of the Cromford Canal (i.e. prepare a Resource Statement); and
- Undertake a preliminary examination of the costs, benefits and risks of a number of development options (an Options Appraisal).

Further details of the brief are given in sections 1.3.1, 1.3.2 and 1.3.3 of this report.

The area covered comprises the Cromford Canal from the current head of navigation at Great Northern Basin in Langley Mill to Cromford Wharf, and also the Pinxton Arm from its junction at Codnor Park to its terminus at Pinxton.

This report includes an introductory section which outlines the methodology applied and a review of national and local planning policy.

Resource Statement

The Resource Statement was prepared using information provided by the Friends of the Cromford Canal, the Erewash Canal Preservation & Development Association, and Derbyshire Wildlife Trust. The entire length of the canals was visited by members of Atkins inland waterways team, and joint visits were made by Atkins Ecologist and Derbyshire Wildlife Trust to Stoneyford Lane, Bentley Bridge and the Ambergate to Cromford section of the canal.

Approximately 40% of the canal was found to be in water to a degree, with most structures present and generally requiring refurbishment rather than replacement if navigation were to be restored. A further 45% retains physical evidence of the line of the canal and some structures, but the canal itself has been infilled and would need to be re-cut, and many new structures would need to be provided. Around 15% of the canal has been lost or land redeveloped. The Butterley Tunnel remained largely intact at the time of the last informal survey (2006) but there is at least one collapse and inadequate air draft (headroom) for navigation in many places.

Key engineering issues to be resolved for restoration or partial restoration of navigation are:

- Provision of a crossing under the A610 Langley Mill bypass[1];
- Replacement of Top of Flight Lock 1 at Codnor Park Reservoir whilst maintain an approach to flood routing away from the reservoir dam which is satisfactory in engineering terms;
- Refurbishment, replacement or deviation to restore navigation through or around Butterley Tunnel;
- Replacement of the aqueduct over the road and railway, and possibly the river[2], at Bullbridge.

[1] There is a redundant railway bridge under the embankment which appears suitable for re-use for the canal.
[2] The river aqueduct still exists but its condition is unknown and a replacement structure may be required.

The Cromford Canal is designated as a Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) between Ambergate and Cromford Wharf. The route also passes through a number of Local Wildlife Sites (LWSs) which are not subject to statutory designation.

The Cromford Canal forms a habitat corridor which is likely to be important in enabling the movement of species. A number of UK Biodiversity Action Plan (BAP) priority habitats were identified along the route. Notable species present or likely to be present include water vole, white clawed crayfish, great crested newt, bats, badger, otter and reptiles (particularly grass snake). Much of the route is likely to be of value to a range of breeding birds, and the eastern section if of value for migrant birds.

The canals and their ancillary land are of considerable heritage value. It has 23 listed buildings which are either part of the fabric of the canal or ancillary to its operation, with a further 14 listed buildings adjacent to the line. There are three Scheduled Ancient Monuments: High Peak Aqueduct, Wigwell Aqueduct, and Leawood Pumphouse. The Cromford Canal's principal heritage significance however is as a significant part of the UNESCO Derwent Valley Mills World Heritage Site. The canal enters the World Heritage Site at Ambergate and terminates at Cromford Canal Wharf. The World Heritage Site Management Plan includes three key monitoring views of the canal.

In terms of character, the area around Codnor Park Reservoir is attractive, but the key character area from a heritage, environment and scenic perspective, is the section of the canal from Ambergate to Cromford Wharf. Many structures still survive and these are scheduled and described in the Resource Statement.

Consultation Workshop

Following the preparation of the Resource Statement, it was clear that restoration to the East Portal of Butterley Tunnel from Langley Mill could be relatively straight forward, if it could be designed in such a way as to offer suitable environmental mitigation and enhancement. It would not however present anything to the cruising market that is not already available elsewhere and thus may attract relatively low levels of use other than as an additional location for moorings (there is a national shortage of suitable sites) where these could sympathetically be accommodated.

Full restoration of navigation from Langley Mill to Cromford would present a very attractive addition to the national inland waterways offer, but is also much more complicated in engineering terms and potentially damaging in environmental terms.

A workshop was held in February 2011 to validate the Resource Statement and to bring together the various stakeholders to get all parties working together towards to Options Appraisal.

Several key threads emerged for the Options Appraisal:

- Whilst the demands of managing some sections of the canal as both nature reserve and navigation initially seem in part contradictory, the consultees quickly identified ways in which these conflicts could potentially be resolved and a strategy which would be beneficial both to conservation of the natural environment and provision for some navigation could clearly be negotiated;
- The consultees appreciated and accepted the difficulty of achieving full restoration to navigation, in terms of funding, engineering, and conservation;
- The principle that no development work should be undertaken to the canal which would make future restoration of the canal more difficult was identified and accepted;
- The need for an incremental approach, which may not ultimately result in restoration of the entire canal to navigation, was also generally accepted.

Options Appraisal

The brief calls for four options to be considered, these were:

a) Do nothing (this is actually a do minimum option as the brief specifies that this should reflect the current situation, and referred to as "do minimum" from here on);
b) Development of a linear water park and destination nature reserve with increased public access;
c) Partial restoration to navigation (restoring the section between Langley Mill and Butterley Tunnel including the Pinxton Arm but not restoring the tunnel itself or the sections to the west of the tunnel);
d) Full restoration to navigation.

(a) Do Minimum

The "do minimum" option consists of continuing with the existing status quo in most areas, where there is basic maintenance. It is recognised that a higher standard of stewardship applies within the Cromford Canal SSSI[3] and the Erewash Meadows site and the costs of this have been considered as part of the "do minimum" option. The current condition of the canal in the Ironville / Jacksdale / Codnor Park area was not considered by the stakeholders to be adequate and so an enhanced "do minimum plus" option which includes improvements to this area has also been considered.

Current costs for the "do minimum" option were provided by Derbyshire County Council, British Waterways, and Derbyshire Wildlife Trust. The status quo "do nothing" option has costs of around £200,000 per year and Derbyshire County Council has identified a capital expenditure requirement of £1.1 million.

Atkins has estimated additional costs for a "do minimum plus" option. The capital costs are £110,000 with an additional annual operation / maintenance cost of £4,000. This option would consolidate structures and provide a better towpath surface, signing and project promotion which should increase footfall and ownership within the locality and prevent future deterioration of the structures.

Both the "do minimum" and "do minimum plus" options include dredging the canal between High Peak Junction and Cromford and re-instating the horse drawn trip boat would generate around 15,000 passengers and operator revenue of around £60,000 per year, based on past experience.

(b) Development as a Linear Water Park and Destination Nature Reserve

The Linear Water Park (LWP) is seen as a continuous or near continuous open space along the canal corridor, which would include the canal, and the wildlife, heritage and other attractions along its route. The park would be unified by the water features along its route.

The LWP would include within its boundaries the Destination Nature Reserve (DNR), which would be a mosaic of the various statutory and locally designated wildlife sites.

The DNR would not need to compete with other attractions within the Derwent valley, but could be viewed as part of the whole World Heritage Site offer. Outside of the World Heritage Site, there are fewer other attractions and the DNR could be a bigger draw. It is therefore important to ensure that the DNR includes and promotes the other wildlife sites along the route e.g. the whole Derwent Valley Woodland complex, Chase Road Meadows, the Erewash Meadows LNR etc. The SSSI already has a large visitor presence with walkers, cyclists etc and this base could be built upon. Many of these visitors see the canal as a destination in itself already.

If a large DNR could be created through the spine of Derbyshire, this would provide a major recreational resource for local people throughout its length.

The key issue in creating a viable LWP would be providing sufficient cohesion that the various elements of the Nature Reserve and the other elements of the Park would be regarded as a single leisure offer. This

[3] Derbyshire County Council has a statutory duty to "conserve and enhance the SSSI" through the CROW Act 2000.

could be achieved by improving physical linkages within the canal corridor and providing a unified approach to how intellectual access is offered,

A physical link could be provided along the length of the canal corridor by upgrading the existing sections of towpath and negotiating with the few private landowners to provide better surfaces and permissive cycle access to form a shared use route extending along the course of the former canals. This would link Langley Mill, Pinxton and Cromford and provide access to existing cycle routes such as the Erewash Valley Trail, Ripley Greenway, High Peak Trail and Ashfield District Cycleways. The route, together with strategically located parking and visitor facilities, would greatly enhance access to the various wildlife sites in the DNR and also to heritage and other visitor attractions in the LWP.

Applying a consistent branding approach (to directional and interpretive signage and publicity material) and streamlined access to information (a single visitor website and overall promotional leaflets) would encourage users of one part of the LWP and DNR to explore other parts, creating repeat visits and increasing access to the various resources within the canal corridor.

A table identifying the key characteristics of each section of the canal corridor and identifying some more detailed opportunities for development to deliver the LWP and DNR is given in section 10.4.

This option allows little opportunity for direct revenue and benefits are likely to accrue as a result of footfall and expenditure in the local economy. There is unlikely to be significant revenue which could support the additional maintenance / operation costs for example from boat hire concessionaires or angling revenues. However, either combined with partial or full restoration or implemented on its own, this option would appear to allow for significant indirect revenues and benefits and it is therefore recommended that further work should be undertaken to develop this option and analyse the potential costs and benefits.

(c) Partial Restoration

For the purposes of the study the scope of partial restoration is defined as being a restoration of navigation to the eastern part of the canal, from Langley Mill to the East Portal of Butterley Tunnel, including restoration of navigation to the Pinxton Arm. There is no guidance as to development options for the remaining section of the canal (Butterley Tunnel and the section from the West Portal to Cromford), although the relevant elements of either option (a) or option (b) could be applied independent of the restoration of the eastern section.

A detailed consideration of the engineering considerations for partial restoration (either full or phased) is given in the Options Appraisal (section 11.1 of this report). There is also discussion of environmental considerations, including potential impacts, mitigation and opportunities for enhancement of nature conservation for each section of the canal.

Potential solutions for each of the key engineering issues listed above are identified.

The estimated costs and proposed phasing for partial restoration (excluding professional fees) are given below:

- A610 crossing to end of infill: £7.6 million
- End of infill to Codnor Park Reservoir: £3.4 million
- Codnor Park Reservoir to Butterley Tunnel East Portal: £1.9 million
- Pinxton Arm: £4.6 million

Including professional fees for design, survey and project management, but with no risk allowance, the total capital cost of the partial restoration option is estimated to be around £19.7 million, assuming that all of the work is delivered using construction contractors and consultants (i.e. no volunteer labour has been allowed for).

The first two sections would have to be delivered sequentially. Either of the remaining sections to Pinxton or to Butterley Tunnel East Portal could be restored next, with the remaining section done last.

Operation and maintenance costs can be taken to be around £8,000 per kilometre per year[4]. The entire canal including the Pinxton Arm is around 11 km long, so for full restoration the annual operation and maintenance costs would be of the order of £88,000, increasing after 15 years to £128,000 per annum to cover the costs of lock gate replacement.

It is calculated that at present just over 900 two way boat movements take place on the Erewash Canal per annum. For a partially restored canal with termini in Golden Valley and at Pinxton, this figure is expected to rise to 1,200 movements per year.

Estimated annual benefits for the partial restoration (in terms of expenditure in the local economy) are as follows:

- Boater expenditure on or near Cromford Canal: £54,000
- Boater expenditure on or near Erewash Canal: £54,000
- Bankside visitors: £350,000[5]

These figures do not include additional boat hire generated by the canal or any revenue from boats basing themselves on the canal (mooring fees and visit expenditure).

(d) Full Restoration (Full or Phased)

This option addresses the restoration of the entire canals (Cromford Canal and Pinxton Arm) to navigation throughout. It is recognised that if pursued, this option is likely to be delivered in a phased approach (and thus the partial restoration option above could be seen as an interim point on the way to full restoration as well as an end in itself). However there is no engineering reason why the entire restoration could be delivered other than cost.

A detailed consideration of the engineering considerations (including water supplies) for restoration (either full or phased) is given in the Options Appraisal. There is discussion of environmental considerations, including potential impacts, mitigation and opportunities for enhancement of nature conservation for each section of the canal.

Potential solutions for each of the key engineering issues listed above are identified.

The various inspections of Butterley Tunnel have been reviewed and the preliminary conclusion is that whilst the tunnel could be returned to a navigable condition it is likely that doing so would be as costly as alternative options. It is very difficult to see how the risk of operating the refurbished structure could be addressed in a satisfactory way without providing a tug system similar to that used at Standedge Tunnel. This would act as a potential deterrent to boaters completing the journey through the tunnel (especially as it would have to be done in both directions – Standedge forms part of a cruising ring and can be avoided on the return). It is recommended that options to provide a replacement tunnel on an alternative alignment or to provide a deviation taking the canal up and over the high ground should be investigated.

The second major engineering issue is the provision of a new crossing to replace the missing road and railway crossings at Bullbridge. In addition improvements or a replacement may be required for the aqueduct which carried the canal over the river: this still exists but is in unknown condition. The engineering here

[4] Based on data provided by British Waterways
[5] Bankside visitors are those visitors who are not using boats. It should be recognised that without the presence of the boats bankside visitor numbers are generally much lower. The assumptions are based on a Coopers and Lybrand report which established a baseline prior to the restoration of the Kennet and Avon canal and then investigated visitor numbers and expenditure post-restoration.

would best be addressed as part of a masterplan for redevelopment of the wider area, including Stevenson's and the Transco yards.

The key environmental issue is that of boats and the corresponding turbulence causing damage to the SSSI. At the workshop a way forward was identified which would involve creating a terminus for private boating in the vicinity of Ambergate, with onward travel to Cromford via a specially designed trip boat. This would have much less impact on the SSSI.

The estimated costs and proposed phasing for full restoration (excluding professional fees) are given below:

- A610 crossing to end of infill: £7.6 million
- End of infill to Codnor Park Reservoir: £3.4 million
- Codnor Park Reservoir to Butterley Tunnel East Portal: £1.9 million
- Butterley Tunnel replacement: £10.6 million
- Butterley Tunnel West Portal to A610: £0.9 million
- A610 to Excavator Public House: £2.3 million
- Excavator Public House to Brickworks Lane: £1.8 million
- Brickyard Lane to Transco: £3.7 million[6]
- Ambergate to Cromford: £2.2 million[7]
- Pinxton Arm: £4.6 million

Including professional fees but with no risk allowance, the total capital cost of the full restoration option is estimated to be around £43.8 million, assuming that all of the work is delivered using construction contractors (i.e. no volunteer labour has been allowed for).

Utilities crossings have been identified and where there are significant costs associated with potential re-routing, the costs are included in our estimates.

Although not allowed for in the estimates, volunteers, and specialist volunteer organisations such as the Waterways Recovery Group in particular, can have a significant impact on costs. Typically canal society volunteers can undertake lighter work such as site clearance, path surfacing, erection of signs and other canal furniture, planting, habitat improvements etc. In some cases suitably qualified and dedicated volunteers have provided professional services to canal restoration projects. The Waterways Recovery Group are in effect a full blown contracting outfit in terms of capabilities, and when restoring existing structures are generally limited only by the amount of volunteer time available to them unless there are particularly difficult structural challenges requiring much specialist work. Savings of the order of 10% of the total cost have been achieved in the past. The savings possible on this project would obviously be subject to the levels of skill and commitment available and also to the project programme.

In general the stages outlined above would have to follow on sequentially. The Pinxton Arm could be delivered at any point after restoration reaches Codnor Park Reservoir.

The entire canal including the Pinxton Arm is around 27 km long, so by the same methodology as for partial restoration, the annual operation and maintenance costs of full restoration would be of the order of £216,000, increasing after 15 years to £256,000 per annum to cover the costs of lock gate replacement.

It is calculated that at present just over 900 two way boat movements take place on the Erewash Canal per annum. For the fully restored canal with a terminus in the Ambergate area around 1,800 boat movements per year could be anticipated. Movements to Ambergate (and consequently visitor expenditure) could be

[6] Assuming section through Transco and Stevenson's Yards delivered by planning gain (costs of this section omitted from above)
[7] Note that this figure is for a fully navigable restoration, the figure given for this in Option (b) is for a greatly reduced scope of works to allow navigation by unpowered craft such as canoes and a shallow drafted tour boat only

significantly higher if a marina could be constructed there as part of redevelopment, and this option should be explored if / when firm development proposals are made.

Estimated benefits for full restoration (in terms of expenditure in the local economy) are as follows:

- Boater expenditure on or near Cromford Canal: £142,000
- Boater expenditure on or near Erewash Canal: £81,000
- Bankside visitors: £712,000[8]

These figures do not include additional boat hire generated by the canal or any revenue from boats basing themselves on the canal (mooring fees and visit expenditure).

Conclusions

Given the range of potential scenarios it is not possible to identify a single option and recommend that it should be pursued.

Full restoration is a major and expensive task, so we conclude that full restoration should remain an aspiration for the long term future, whilst accepting that setting a timescale for its achievement is a difficult task. The canal corridor could be developed in the following stages:

Stage One

- Maintain and improve the Cromford to Ambergate section, for the benefit of wildlife habitats along the entire route and for limited navigation (suggest unpowered boats including trip boat) between Cromford and Whatstandwell;

- Undertake basic clearance and enhancement works at Ironville Locks to a standard that allows subsequent restoration (as outlined in “do nothing plus” option);

- Identify routes and secure landowner agreements for shared use path links between Langley Mill and Ironville, along Pinxton Arm and from Butterley Tunnel East Portal to Ambergate (to facilitate stage 2);

- Progress existing proposals for restoration of the Smotherfly Opencast section, and for former British Coal site between Pye Bridge and Pinxton

Stage Two

- Implement shared use trail throughout and launch Linear Water Park, bringing together statutory and local wildlife sites to form Destination Nature Reserve

- Possibly dredge sections at Jacksdale and in Golden Valley to provide further angling and unpowered boating opportunities

[8] Bankside visitors are those visitors who are not using boats. It should be recognised that without the presence of the boats bankside visitor numbers are generally much lower. The assumptions are based on a Coopers and Lybrand report which established a baseline prior to the restoration of the Kennet and Avon canal and then investigated visitor numbers and expenditure post-restoration.

Stage Three

Implement partial restoration from Langley Mill to Golden Valley and Pinxton, with interim termini potentially

- Pye Bridge;
- Pinxton;
- Golden Valley.

Stage Four

Complete full restoration to Ambergate, dependent on redevelopment at Bullbridge: and with the operational regime from Ambergate to Cromford to be agreed.

1. Introduction

1.1. Introduction

This report has been prepared by Atkins Limited with the support of Moss Naylor Young Limited, specialist providers of consultancy services into Inland Waterways. The report answers a brief from Derbyshire County Council to report on the resource that is the Cromford Canal, with a view to identifying the extent of this resource and its future use for wildlife habitat and leisure and tourism.

The report has been collated following a series of site visits in which the engineering specialist, the heritage specialist and the ecologist on the study team have visited all the extant remains and those sites where the canal needs to be reinstated or a new alignment constructed if restoration were to occur. Under the terms of the brief, this report explores whether restoration should be the ultimate aspiration, and how else the canal might be developed.

In the course of this study the team has consulted with a number of bodies, and held a one day workshop to discuss the mooted options for the canal. One of these bodies, the Friends of the Cromford Canal, in effect drove the desire for this study to be undertaken as this body has a long term aspiration for full restoration of the canal, an aspiration that at face value might be seen as conflicting with the aspirations of other bodies such as the Derbyshire Wildlife Trust.

1.2. History

1.2.1. History of the Cromford Canal

The Cromford Canal started life as a proposal to extend the Erewash Canal northwards to facilitate exploitation of the local coalfields. When the Erewash Canal Company declined to promote an extension to their canal, local business leaders formed a separate company to do this. This company gained an Act of Parliament in 1789 for construction of the route to Cromford from Langley Mill with a branch to Pinxton. The Cromford Canal opened in 1794 and was 14 miles long with 14 locks and four tunnels, the longest being Butterley Tunnel. The Pinxton Arm is around three miles long, and there was also a short branch known as the Leawood or Nightingale Arm.

Initial trade was good and tonnages gradually rose. The tunnel at Butterley proved a significant bottleneck with only two short time slots to enter the tunnel from each end in any 24 hour period. In the mid 19th Century to cope with demand the company introduced night passages of the tunnel to allow a third passage every twenty four hours.

The Cromford Canal Company merged with the Manchester, Buxton, Matlock and Midlands Joint Railway in 1852, after which much of the trade was diverted to rail and only local traffic continued along the canal. Subsidence was causing problems for Butterley Tunnel and in 1900 a final collapse caused the tunnel to be closed permanently. Traffic continued above the tunnel for a number of years, with coal and lead being carries to Cromford and High Peak Wharf for onward transit via the Cromford and High Peak Railway. Most of the canal was formally abandoned in 1944 by which time there had been little trade for several years other than the carriage of chemicals to the Pinxton Arm.

Following closure the canal was gradually destroyed in many places. Bullbridge Aqueduct was demolished in 1968 to allow Ripley Road to be widened, and gradually much of the line from Ambergate to Butterley disappeared. Part of the Pinxton Arm was lost to open cast mining. The 1968 Transport Act did not list the canal, in as far as it survived, as either Commercial or Cruiseway, understandable given it was totally

derelict. By default those lengths that are owned by British Waterways are to be treated as "Remainder" waterway and must be dealt with in the most cost effective manner consistent with public safety. Under this remit, in the 1980's British Waterways demolished lock 1 at Ironville and lowered the canal bed to act as a spillway for Codnor Park Reservoir. The Section of the Cromford Canal between Cromford Wharf and Ambergate and the Lea Wood Pump was purchased by Derbyshire County Council from British Waterways in 1974.

1.2.2. History of Restoration

The now defunct Cromford Canal Society restored the section between Cromford and the winding hole at Leashaw from 1973 onwards and ran a horse drawn trip boat from Cromford to Lea Wood. This attracted 15,000 passengers per year and coupled with steaming Lea Wood beam engine provided a significant attraction. However, the society got into financial difficulties and was wound up in 1990, leaving Derbyshire County Council with the liability for this section. In recent years an organisation carrying the name The Friends of the Cromford Canal has taken over the mantle for promoting restoration.

1.3. Scope of Work

The informal Cromford Canal Consortium was established in 2009 in order to explore the long term management and development of the significant heritage, ecological and recreational asset which is the Cromford Canal.

The consortium includes representatives from Derbyshire County Council, Amber Valley Borough Council, Derbyshire Dales and Bolsover District Councils, Natural England, the Derbyshire Wildlife Trust and Friends of the Cromford Canal, a number of national organisations and other interested parties.

The consortium currently has no legal status but is actively working towards the formation of a standing "Cromford Canal Partnership" on the lines of that already established for the Chesterfield Canal (http://www.chesterfield-canal-partnership.co.uk/partnership_constitution.html).

The aims, objectives, and scope of the study from the brief are given in sections below.

1.3.1. Aims of the Study

Section 5 of the brief states the aims of the study are:

- *To provide a body of objective data on the current condition of the Cromford Canal (including the Pinxton Arm) with particular reference to Heritage, Ecology, Access and Engineering condition;*
- *To explore the key options for the long term management of the Cromford Canal and its associated heritage and ecological features.*

1.3.2. Objectives of the Study

Section 6 of the brief gives the objectives of the study:

Part One: Determining the Canal Resource

The consultants should set out to establish: -

> *(a) The extent and current condition of the archaeological, heritage, ecological and environmental resources of the Cromford Canal.*
>
> *(b) The extent and current condition of physical access to the canal (including towpath and access node condition, connectivity and access to public transport and car parking etc.)*

(c) The degree of intellectual access (understanding of its history, ecological and cultural significance) which people have to the canal.

(d) The current engineering condition of the surviving structures on the canal, their structural stability, their maintenance requirements and their potential for restoration to navigation. The condition of Butterley Tunnel is of particular note.

Prior studies are available as benchmarks to determine the direction of change in the condition of the resources.

Part Two: Exploration of Development Options

The consultants should identify: -

(a) Who the possible and potential partners in the project might be (with the assistance of existing partners);

(b) The aspirations and concerns of the potential partners for the future of the waterway and their response to the key development options noted below;

The consultants should explore the key options for the future of the canal using the baseline of the resource study. The key options are:

(a) Do nothing (current situation); maintain the individual sections as separate waterways, nature reserves and heritage features;

(b) Development as linear water park and destination nature reserve (a site or series of linked sites with high significance for biodiversity, heritage and recreation) with increased public access via footpaths and cycle ways (increased interpretation of archaeological and natural heritage etc);

(c) Partial restoration to navigation. Restore the section between Langley Mill and the Butterley Tunnel including the Pinxton Arm to full navigation but do not restore the Butterley Tunnel itself or the sections to the west of the tunnel;

(d) Full restoration to navigation. Restore the entire waterway to full navigation including the Pinxton Arm, the Butterley Tunnel and the western section to Cromford Mills.

The options above are indicative of the range of development possibilities under consideration. They are the basic minimum which should be considered in detail but should not preclude consultants from suggesting refinements and modifications of the options or new options as is indicated by the evidence as the project develops.

In order to establish the potential risks, costs and benefits of each of the key options … it is expected that the consultants will set out to:-

(a) Review planning and related development policy, robustly identifying statutory and non-statutory constraints and opportunities;

(b) Review the principal constraints and difficulties to be faced in restoring the heritage and ecological assets of the Canal and to consider how these difficulties might best be overcome;

(c) Review the water requirements of the Canal and the best means of providing the necessary water resources;

(d) Assess the economic, social, heritage, environmental and ecological benefits of all the options in Paragraph 6.4 to the local community, as well as regionally and nationally.

1.3.3. Scope of Study

The brief gives the following scope in Section 7:

The study is to cover the entire length of the Cromford Canal and its branches.

The study is to relate the canal to its immediate hinterland and to examine both the canal track (that land currently occupied by the canal or which is required to restore the canal), the canal corridor (that land within 1000m of the canal line - i.e. a 2km wide swathe where the ecological, economic and social benefits may be highest) and the wider surrounding area (in practice other heritage and ecological features)

When considering options involving the restoration of the canal to partial or full navigation, where the canal is obstructed by development, the consultant shall review various options for dealing with the situation; these shall include restoration along the original route, restoration along previously identified alternative route(s) and restoration along other routes that appear to the consultant to be practicable.

The Consultant is not required to investigate land ownership. Where it is necessary to enter private land for the purposes of the study, the consultant shall make their own arrangements with the landowner and do so under his own liability. Details of land ownership, where known to the client, will be provided, the consortium will provide an open letter explaining the scope of the study, copies of which he/she may give to landowners affected.

Water resources shall be reviewed in consultation with the Environment Agency, and if necessary, the regional water supplier. This aspect of the study shall consider surface and ground water supplies, including runoff from major paved surfaces, reuse of treated effluents and possibilities for storage within or outside the canal and of back pumping. The impact of all options … on water quality, land drainage, flood management and wildlife habitats are to be included.

It is assumed that all options … will entail some level of engineering work and for all options; the study shall include sufficient engineering detail, including all critical dimensions and levels, to permit realistic estimates of the costs of the works proposed. All cost estimates shall be based on the assumption that the works will be carried out by commercial contract awarded through competitive tendering at prices current on the submission date of the final report of this study. The consultant will indicate those works that can be undertaken by voluntary groups and the cost savings that would be achieved.

The assessment of the ecological and environmental impacts of all options … shall be based upon a data search along the route corridor on environmentally sensitive sites e.g. national, district and local designations and a walk over (initial outline baseline) survey of the canal route and its environs examining biodiversity, priority habitats, legally protected species, nature conservancy, landscape character and water quality. Opportunities for mitigating works should be identified. In undertaking this element of work the Ecology and Environmental management (IEEM) guidelines should be adopted as the benchmark.[9]

Benefits of all options … shall be assessed in terms of user visits and enjoyment value, additional income attracted to the area, increased employment, social and environmental benefits, enhancement of property values etc, so that the benefits of restoration can be compared with those of other public investments in the area.

For options that include some level of navigation, the dimensional standards to be adopted in the study are as follows:

[9] IEEM guidelines were not in the end applied to the assessment of ecology and environmental impacts: the approach used was agreed with Derbyshire Wildlife Trust on 3 November 2011.

- *Craft – maximum size - length 70ft (21.4m) (IWA Standard of 22m to be adopted where new locks are being provided). - beam 7ft (2.5m) west of Butterley tunnel, 14ft (4.5m) east of Butterley Tunnel - draught 3ft 6in (1.2m) throughout.*

- *Channel: - bed width 8m (or as original construction), minimum width at locks 2.5m west of Butterley Tunnel 4.5 m east of Butterley Tunnel (or as original construction) minimum width at bridges 3m west of Butterley Tunnel, 4.5 m east of Butterley Tunnel (or as original construction).*

- *Towpath width 3m*

- *Minimum depth 1.5m with freeboard 0.3m*

- *Minimum air draught, 2.4m or as original construction.*

Level of use: this should be determined for all options… taking as a guide levels of use of similar waterways, taking account of any restrictions revealed by the engineering study, and of the levels of demand indicated by the benefits study.

Water supplies should be adequate to cope with the effects of a 1 in 10 year drought.

The consultant shall obtain information on all utilities crossing, or passing near to, the canal and shall estimate the costs of re-routeing them where necessary.

The study shall summarise overall conclusions on the feasibility and viability of all options ... This should be in terms of the economic and social benefits, the capital and running costs, environmental impact and benefits, and sources of funding.

1.4. Approach to Resource Statement

This report covers the condition of the canal between Langley Mill and Cromford Wharf, and the Pinxton Arm from its junction with the main line at Codnor Park reservoir to Pinxton Wharf. The condition of the asset is described in terms of the following four aspects:

1. The physical condition of the engineering asset, generally being compared with that of an operational canal
2. The ecology and environmental conditions that prevail, with notes on the habitats existing and any designations in force, and an indication of vulnerability to damage in the event of change
3. The heritage asset, i.e. the cultural and built heritage value of the remains of the canal in terms of both their state of preservation and importance in telling the story of both local and wider histories;
4. The character of the canal corridor, whether this is a place that will appeal to leisure users on foot and afloat, whether areas present a feeling of safety and security, whether any section has the character of a “destination” rather than just a “route to somewhere”

In order to provide a coherent and comprehensive report, and allow a ready understanding of the condition of any one stretch of canal, the canal has been divided into the following lengths:

- Eastern Section – Langley Mill/Great Northern Basin
- Eastern Section – Lock 13, Langley Mill to end of infill
- Eastern Section – End of Infill to Butterley Tunnel Eastern Portal

- Central Section – Butterley Tunnel
- Central Section – Butterley Tunnel Western Portal to A610

- Central Section – A610 to Chesterfield Road
- Central Section – Chesterfield Road to Brickyard Road
- Central Section – Brickyard Road to Transco

- Western Section – Ambergate to Cromford

- Pinxton Arm – Ironville to Erewash Valley Line
- Pinxton Arm – Erewash Valley Line to Pinxton

The report takes each length in turn and addresses the three core subjects of engineering, ecology and character. For reference an overall map of the canal, provided by the Friends of the Cromford Canal, is included in this report as Appendix A.

1.4.1. Engineering

The engineering and heritage resource has been assessed by undertaking a review of the following data:

- Report on Inspection of Butterley Tunnel Undertaken on 20th October 1979, Robin Witter
- Report on Survey of Butterley Tunnel, Tina Cordon, 2006
- "Feasibility Study for the Restoration of the Cromford Canal from Langley Mill to Ironville – Final Report", Binnie & Partners, April 1994

In addition site visits were carried out by Derek Fenn, Jim Tinnion, Patrick Moss and Ross Goodchild, all of the Atkins team, in the week commencing January 31st, 2011.

For each section of canal, the resource statement identifies the engineering condition of the asset, whether the track and structures exist and their condition if they are extant.

1.4.2. Environmental Methodology

The Multi Agency Geographical Information for the Countryside (MAGIC) website (www.magic.gov.uk) was reviewed for information on statutory designated sites of nature conservation importance within 1 km of the Cromford Canal between Cromford Wharf and Langley Mill. Biodiversity Action Plan (BAP) Priority Habitats and notable habitats such as ancient woodland and were also identified within approximately 500 m of the Site using MAGIC, Natural England's Nature on the Map website (www.natureonthemap.org.uk) and using Ordnance Survey maps and aerial photography. The National Biodiversity Network (NBN) gateway website (www.nbn.org.uk) was also used to locate information on protected species within the vicinity of the canal route, although this was not an exhaustive search.

Derbyshire Wildlife Trust (DWT) was consulted through a meeting between Keiron Huston and Richard Spowage (DWT) and David Coote (Atkins ecologist) on 26th January 2011 for information on notable nature conservation features and Local Wildlife Sites (LWS) and for their opinion with regards to potential impacts and opportunities in relation to any proposals.

Parts of the canal were inspected by an ecologist on 26th January 2011, in particular the Cromford to Ambergate section and parts of the eastern section at Stoneyford Lane and Bentley Bridge to inform the appraisal of nature conservation resources within the canal corridor.

1.4.3. Heritage Asset

In each section of the resource statement, there is a discussion of the heritage asset that each length of canal represents. This has been determined against the following criteria:

- To what extent the canal and any structures associated with it are in the condition they would have been when the canal was open to navigation?
- The extent to which any structures have been repaired in non-original materials
- How readily any repair or failure can be reversed: For example, Buckland Hollow Tunnel could readily be put back into navigable order (although the canal leading to it is another matter) whereas locks 8-13 appear to have been lost and cannot be reinstated as heritage assets.
- The significance of the asset: e.g. is the particular structure of local or national interest

This methodology is drawn from that used in assessing bids to the Heritage Lottery Fund for grants and in assessing the heritage aspects of conservation management plans.

1.4.4. Character Appraisal

To ascertain the character of any length of canal a walkover survey was undertaken, along with research of the route from aerial photographs. The surveyor, a chartered town planner with experience of urban and rural character appraisals, not only took into account the obvious use and character of an area, but its aesthetics and evidence of either positive or negative indicators such as pro-active management and provision or vandalism, graffiti and fly tipping. The character was compared to other canals in the UK to give a comparison as to the likelihood that those who walk or cruise canals would be attracted or put off by any lengths encountered.

In the western section, reference has been made to the rail service paralleling the canal (it was actually used to return the surveyor to his car). Elsewhere we are aware that good bus services are provided, and encountered walkers who commented on the flexibility these provided.

The overall condition of the footpaths and towpath was good, although wearing boots is recommended on these. No further comment is made as all paths reached a standard that visitors would be happy with.

1.5. Consultation

A workshop was held in February 2011 to review the findings of the Resource Statement and to develop options scenarios for the Options Appraisal.

The following organisations were represented at the workshop:

- Amber Valley District Council
- Bolsover District Council
- Bullbridge and Sawmills Area Civic Society
- Chesterfield Canal Partnership
- Dethick, Lea and Holloway Parish Council
- Derbyshire and Nottinghamshire Entomological Society
- Derbyshire Bat Society
- Derbyshire County Council
- Derbyshire Economic Partnership
- Derbyshire Wildlife Trust
- Derwent Valley Mills World Heritage Site Partnership
- Erewash Canal Preservation & Development Association
- Friends of the Cromford Canal
- Inland Waterways Association
- Midland Railway Trust

- Network Rail
- Ripley Town Council

The Resource Statement was generally accepted as being factually accurate and a suitable basis for the options appraisal, and a number of minor corrections were identified.

The workshop was structured as follows.

During the day groups were allocated to sections of canal. The intention was that each of the three groups had a balanced participation. It was particularly important that each group had a “pro-restoration” and a “pro-wildlife” representative. There is no fundamental reason why the two cannot co-exist but each has to act as a check on the other to ensure that the two interests co-exist successfully. Other attendees were either placed in the workshop session dealing with their local area or with the section of canal of their choosing, for example the Network Rail representative chose to be present in the session dealing with Bullbridge Aqueduct which crosses a main line railway.

Several key threads emerged for the Options Appraisal:

- Whilst the demands of managing some sections of the canal as both nature reserve and navigation initially seem in part contradictory, the consultees quickly identified ways in which these conflicts could be resolved and a strategy which would be beneficial both to conservation of the natural environment and provision for some navigation could clearly be negotiated;
- The consultees appreciated and accepted the difficulty of achieving full restoration to navigation, in terms of funding, engineering, and conservation;
- The principle that no development work should be undertaken to the canal which would make future restoration of the canal more difficult was identified and accepted;
- The need for an incremental approach, which may not ultimately result in restoration of the entire canal to navigation, was also generally accepted.

1.6. Options Appraisal

The second part of the report is an options appraisal, in which various options for the future status and treatment of the canal are considered. It would be possible to come up with a multitude of options but this would rapidly become unmanageable and incomprehensible, thus in principle for any one length of canal we have identified three possible scenarios

Do Minimum: For some lengths where the canal has been destroyed this could be do nothing, but in most cases do minimum still requires some management. The Western Section has environmental designations and is in part in the World Heritage Site, both of which place obligations on the owners and the local authorities regarding how it is maintained. The surviving parts that are owned by BW have remainder status, requiring BW to maintain them in “the most cost effective way consistent with public safety” Any lengths of canal or structures not owned by BW also have to be maintained with a view to public liability.

Linear Park and Destination Nature Reserve: this option is defined in the brief as development [of the Cromford Canal and Pinxton Arm] as linear water park and destination nature reserve (a site or series of linked sites with high significance for biodiversity, heritage and recreation) with increased public access via footpaths and cycle ways (increased interpretation of archaeological and natural heritage etc). The thrust of our method has been to identify what opportunities are offered by each section of the canal corridor and how these might be developed to give an increased sense of the canals as a single entity with improvements to both access and connectivity of the individual elements, both physically and in terms of intellectual access.

The **Partial Restoration** option is substantially the same as full restoration for the Eastern Section and Pinxton Arm. Treatment of the Central and Western Sections could either be as for the “do minimum” or the “linear park and destination nature reserve” option, or a synthesis of the two.

Full restoration: This would entail full restoration to navigable standard for the length of canal under consideration. With a clearly defined end point it has been possible to make an initial estimate of the costs and some of the more tangible benefits of the scheme.

Following the options appraisal the future of each section of canal and of the canal as a whole is considered.

2. Local and National Planning Policy

Any proposal for restoration will have to work through the development control system. Works of any scale will require planning permission which in turn will be granted, or declined, with reference to the development plan for the area. In addition, the development plan has the potential to provide protection for proposals against other developments that would render restoration impractical. This section examines national and local policy as it relates to the canal.

2.1. National Policy

Planning Policy Statement 1 – Delivering Sustainable Development sets out the Government's overarching planning policies on the delivery of sustainable development through the planning system. It makes no specific reference to canals or waterways but lays down the fundamental principles by which local authorities should devise development plans and determine planning decisions. It is supported by 23 other Planning Policy Statement or Guidance notes.

The principle policy instrument affecting canal restoration is Planning Policy Guidance note 13: Transport (PPG13). This is not because restored canals are viewed as a means of transport but because transport infrastructure has in the past had a deleterious effect on restoration schemes. The main reference comes in Appendix B, Planning for Transport, where PPG 13 notes

> 13. In general, proposals for waterside development should seek to enhance the use, enjoyment and setting of the adjacent waterway. Development proposals, local plan policies, or new and improved infrastructure, such as road proposals, should not adversely affect inland waterways. Where this may happen, local authorities should consult BW or other navigation authorities, the Environment Agency in its regulatory capacity, the Inland Waterways Association and local waterway organisations. In liaison with these bodies, local authorities should identify and **where appropriate protect disused waterways** (by allocating the land in development plans and **ensuring sites and routes are not severed** by new development or transport infrastructure) where there is a reasonable degree of certainty of a restoration project proceeding, in whole or in part, within the Plan Period

At present it is highly unlikely that the Cromford Canal is afforded any protection under this, as there is currently no credible scheme for restoration. If it is decided to pursue full restoration, then a scheme should be devised along with an alignment that can be defended. Combining the Multi-User trail with the proposals will assist in this as this will be a corridor in itself, and any arguments with developers seeking to block the line will be reduced to how wide a corridor should be provided rather than the principle of providing a corridor in the first place.

It should be noted, however, that central government doesn't always follow its own advice. The Grantham Canal has had a new obstacle placed in the way of restoration, with a fixed crossing at Cotgrave. The defence used by the secretary of state is that the new crossing is on the site of an existing obstacle, and thus this doesn't make restoration any more difficult, however the character of the road over the obstacle has changed completely as it will now carry much more traffic.

PPG 13 has other references, one of which is relevant here

> 8. Encouraging pedestrian routes, for instance, along river banks, canal towpaths or disused railways to be highly visible and integrated with other activities, in order to maximise pedestrian safety and security.

The wording of this provision is doubly significant: routes along canals should be encouraged, and they should be visible and integrated for safety and security. This would indicate that the proposed multi-user trail finds favour in national policy.

The other most notable national policy instrument affecting canal restoration is PPG9, Biodiversity and Geological Conservation. One of the key principles in PPG9 would guide any decision regarding policy towards the Cromford Canal and decisions made in developing it as a resource is found in 1.ii

> Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment. Plan policies and planning decisions should aim to maintain, and enhance, restore or add to biodiversity and geological conservation interests. In taking decisions, local planning authorities should ensure that appropriate weight is attached to designated sites of international, national and local importance; protected species; and to biodiversity and geological interests within the wider environment.

PPG 9 also embraces the principles of preventing harm to biodiversity and of promoting further habitat enhancement

Canals are specifically mentioned once in PPG9 under “Networks of Natural Habitats”

> **Networks of Natural Habitats**
>
> 12. Networks of natural habitats provide a valuable resource. They can link sites of biodiversity importance and provide routes or stepping stones for the migration, dispersal and genetic exchange of species in the wider environment. Local authorities should aim to maintain networks by avoiding or repairing the fragmentation and isolation of natural habitats through policies in plans. Such networks should be protected from development, and, **where possible, strengthened by or integrated within it**. This may be done as part of a wider strategy for the protection and extension of open space and **access routes such as canals and rivers, including those within urban areas.**

Development of the Cromford Canal, for navigation or as a linear park, would appear to create clear opportunities to strengthen networks of natural habitats in the area.

The Government has issued a White Paper “Natural Voice: Securing the Value of Nature”. This paper is not just about conservation but about the whole concept of service ecosystems and looks at a new approach in which ecosystem management is integral to human processes. The paper therefore deals with ecosystems related to farming and industry as well as at a pure conservation level.

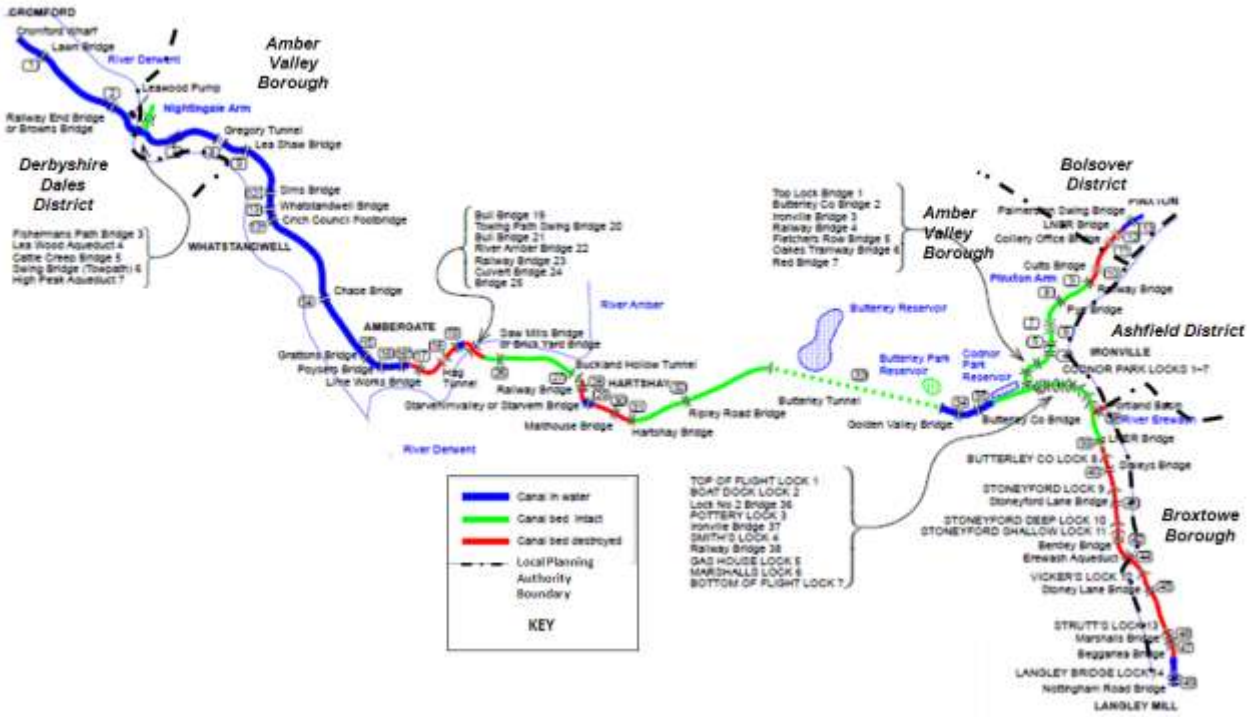
Planning Policy Statement 5, "Planning for the Historic Environment", provides policies related to development proposals affecting “Heritage Assets” and can be applied directly to development control decisions as well as influencing development plan proposals. The statement includes guidance on buildings with statutory protection and those without and can be applied as such to any heritage assets along the canal whether or not they are listed or form part of the World Heritage Site designation

Planning Policy Statement 4 (PPS4) sets out the Government's comprehensive policy framework for planning for sustainable economic development in urban and rural areas. It includes policies on planning for economic development in rural areas, planning for tourism in rural areas and planning for non-residential car parking, all of which are likely to be highly relevant to any proposals to utilise the resource offered by the Cromford Canal.

Circular 07/2009 – The Protection of World Heritage Sites covers the protection and management of such sites It fulfils the commitment in the white paper Heritage Protection for the 21st Century, published in March 2007, to issue a planning circular "which will further recognise in national policy the need to protect World Heritage Sites as sites of Outstanding Universal Value". In addition to providing general advice reinforcing the provisions of PPS9, it notes the need for management plans for World Heritage Sites and that they are vulnerable to being eroded by incremental change. Small scale developments along the length of canal, and especially at High Peak Wharf and Cromford Wharf, would potentially be examples of this.

It should be noted that the government intends to replace PPG/S notes with a single national planning policy document.

2.2. Local Policy



Schematic Plan of Canals[10] Showing LPA Boundaries

The bulk of the canal is in the Amber Valley Borough of Derbyshire, which simplifies issues with regard to local policy. The exceptions are from the Lea Wood Aqueduct to Cromford Wharf, which is in the Derbyshire Dales district, and near Langley Mill where the historic route drifts into Nottinghamshire for a length. As the A610 Langley Mill bypass follows the district boundary at this location then it will be necessary for the Multi-User trail and any restored canal to cross into Nottinghamshire.

The canal is, by definition, also largely in Derbyshire, as both Amber Valley and Derbyshire Dales are districts of Derbyshire.

The main benefit of the canal being almost entirely within one district derives from the wording of PPG 13 "where there is a reasonable degree of certainty of a restoration project proceeding, in whole or in part, within the Plan Period". It is possible to justify this protection on the basis of progress outside the plan area but it is much more difficult and less reliable. The Cromford to Lea Wood length is not at risk due to other designations and the length in Nottinghamshire is (i) unlikely to be developed for any other use and (ii) can

[10] This plan is based on the Friends of the Cromford Canals map of the canals.

be protected on the basis that it is a short length linked to a scheme in the neighbouring authority. Overall, the dominance of a single authority on the canal line will make policy making and policy enforcement much simpler.

Since the coalition government withdrew Regional Spatial Strategies (RSS) there has been some ambiguity over strategic planning policy. RSS were ultimately intended to replace Structure Plans and their withdrawal has left a vacuum. However where Structure Plans have saved policies it is assumed that these are still valid, and in any event the primary role of a structure plan is to inform policy decisions in a local plan/local development framework.

The Cromford Canal features on the proposals map in the Amber Valley Local Plan. The proposals map indicates the whole of the canal within the Amber Valley area as being a "disused transport corridor" and also identifies sections of the canal as a proposed multi-user route. In addition the canal is identified as being of Geological interest to the west of Butterley Tunnel and a SSSI on the Ambergate to Cromford Section. The plan has general policies on the protection of designated sites.

The commentary in the plan states

> 5.10 Priority needs to be given initially to the development of strategic multi-user routes, including those promoted by SUSTRANS (the national organisation promoting sustainable transport), linking the main centres of population and employment along the Derwent Valley, the Erewash Valley and the routes of the former Cromford Canal and Ripley railway

And:

> 5.18 PPG13 makes reference to the need to protect former transport routes for either potential future passenger and freight movement, or for the provision of new footpath and cycleway links, in order to widen transport choice. Within Amber Valley, there are disused railway routes between Duffield and Wirksworth[11] and between Derby and Coxbench. There is also a need to safeguard the route of the former Cromford Canal.

Policy TP 8 States

> The Borough Council will protect disused transport routes, as shown on the Proposals Map, from any development which could prejudice either their future potential for re-opening, or their development as multi-user routes

In addition to the Amber Valley Local Plan the canal is mentioned within the following documents related to the council

Me & U Action Plan Amber Valley BC:

> "…the potential exists for re-opening the canal network as far as Cromford, linking Heanor/Langley Mill with the Derwent Valley WHS. ...Aims: ...work with various agencies with the longer term aim to re-open the canal to Cromford"

Developing a Regeneration Blueprint for Ironville Amber Valley BC.

> "An environmental improvement corridor along the line of the (Cromford) canal. To improve the canal as an asset…"

Brief for a Canal Corridor Study Amber Valley BC (2000)

[11] The Duffield – Wirksworth railway now forms part of the Ecclesbourne Valley Railway (http://www.e-v-r.com), a heritage railway, which can no longer be regarded as being 'disused'

> "...to use the canal as a spine for regeneration. (the canal) has the potential for a major integrated investment programme …." This study also lists the team for a 'Cromford Canal Corridor Study.

The Derbyshire Dales Local Plan identifies the canal as a SSSI and has general policies on the protection of designated sites. It does not have any policies relating to the canal as a canal or as a corridor, but there are a number of policies relating to development in protected environmental areas, development affecting listed buildings and scheduled ancient monuments, development affecting the world heritage site and development affecting long distance trails (of which the canal towpath is part of one). These policies relate to the natural and built environment, policies NBE 1, 3, 17, 21, 24 and 25, and Leisure Policy L 10.

Thus the canal in Derby Dales is very well protected but there are no policies encouraging its development or use as a resource.

The route also needs protection on the length in Nottinghamshire if either the linear park or full restoration options are to be pursued between Langley Mill and Ironville. Much of the protection in this instance is physical, as any route would pass under the bypass and then between the bypass and the higher land area to the east before reaching Aldercar Western Meadows Nature Reserve. The biggest potential threat is that the opening under the A610 bypass is lost.

Summary

The Structure Plan has a generic policy protecting disused transport routes, and these results in the former route of the canal being identified in the two Derbyshire Local Plans. However this would make an assumption that restoration, if it were to occur, would follow the historic route including passage of Butterley Tunnel. The local plans in Derbyshire further identify the canal for protection as an environmental asset and in some locations as a proposed multi-user route. If it is decided that the canal should be restored to navigation then the case for this needs to be made and a preferred alignment protected in any emerging local development framework.

Part One:

Resource Statement

3. Eastern Section
Erewash Canal to Butterley Tunnel East Portal

3.1. Langley Mill/Great Northern Basin

3.1.1. Condition of Canal Infrastructure

The Cromford Canal begins about 100 yards south (downstream) of Langley Bridge Lock. Although perceived as the uppermost lock on the Erewash Canal Langley Mill Lock is actually Lock 14 of the Cromford Canal. The lock lifts boats to the level of the Great Northern Basin, which is to the East of the Cromford Canal and is actually the first short length of the Nottingham Canal which once led back to Nottingham.

The canal here is navigable, and owned by BW. The Great Northern Basin, lock and swing bridge were leased to the ECP&DA up to about 2005; but were returned to BW. From a short distance above Langley Bridge Lock No 14, the canal is leased to Langley Mill Boatyard Limited and includes their dry dock and moorings, all contained within their boundary fence. To the commencement of these moorings no work is required on the canal other than rearranging moorings to allow passage.

Great Northern Basin

Works to extend the canal north from here, carried out by the Erewash Canal Preservation and Development Association presumably to create more moorings were begun in 2006 but have never been completed pending proposed opencast coal workings.

From the end of the navigable length a new channel would be required to a point where a crossing under the road would be made. Shire Developments received planning consent for the opencast proposal in early 2011 and the consent includes a provision for the canal channel to be created as part of the reinstatement of the site which will be undertaken on completion of the mining activity.

Generally the canal level is similar to the surrounding ground in this section.

3.1.2. Ecology/environment

Designated Sites

There are no statutory designated sites within 1km of this section.

Land immediately to the west and north of the existing marina at Langley Mill is designated as a Local Wildlife Site (LWS).

The Aldercar Flash section of the Erewash Meadows Nature Reserve LWS[12] lies approximately 250 m to the north of this section and is unlikely to be significantly affected by canal work in this section (but see following sections).

The importance of the Erewash Meadows for wildlife was realised in the 1980s when the area was threatened with opencast mining and the Erewash Valley Bird Group (EVBG) was formed. The group undertook systematic recording of birds to show that the area was important for birds and should be safeguarded. Although most of the site is now safe, the EVBG continue to monitor birds today and publishes an annual report.

Important Nature Conservation Features

Grass Wrack Pondweed, a nationally scarce UK BAP species has been recorded in the canal, at its only Derbyshire location. If proposals involve changes to the management or use of the canal, an assessment of the impact of the proposals and effective mitigation (and potentially enhancement) will be required.

Aldercar Western Meadows consist of rough grassland with scrub and trees. The River Erewash forms part of a wildlife corridor. There has been nearly 200 bird species recorded on the Erewash Meadows (which includes the Aldercar Flash Section), including Bittern, Night Heron, Purple Heron, Spoonbill, Little Egret, Red-crested Pochard, American Wigeon, Honey-buzzard, Red-footed Falcon, Quail, Hoopoe, Wryneck, Red-rumped Swallow, Black Redstart and Great Grey Shrike. Water Rail can also be found in the area, as well as wildfowl, birds of prey, warblers, kingfisher, dragonflies, water voles, foxes, weasel and grass snake. Along with tubular water dropwort, Grass-wrack Pondweed (a very rare, native perennial) has been recorded in the Erewash Valley area (at its only Derbyshire location). Both are UK BAP Priority plant species. Water bodies in these areas also have the potential to support great crested newts.

The LWS adjacent to the existing marina at Langley Mill consists of an area of rough grassland with scrub and trees. The River Erewash, which passes this LWS, forms an important wildlife corridor.

3.1.3. Heritage Assets

This short (500m) length of canal is in reasonable condition as a heritage asset, consisting of original structures that have been repaired over the 200 year life of the canal. The canal did fall derelict and was filled in for a period of years but in 1973, Langley Bridge Lock, a short length of canal above the lock, the Nottingham Canal stop lock and swing bridge and the Great Northern Basin were restored by the Erewash Canal Preservation and Development Association (ECP&DA) and Langley Mill Boat Yard.

Further lengths of the Cromford Canal referred to in 3.1.1 above were restored by the Langley Mill Boat Company.

The only significant loss is the lock cottage, demolished by BW in the 1960's. The lock is fitted with Grand Union Paddle Gear, which is not authentic as the Cromford Canal was never owned by the Grand Union Company but is the same as that used by BW on the Erewash Canal.

[12] The Erewash Meadows Nature Reserve falls across the county boundary between Nottinghamshire and Derbyshire, with the larger part being in Derbyshire. There are three sections, the Cromford Canal Section, the Brinsley Meadows Section and the Aldercar Flash Section. Aldercar Flash is managed by Nottinghamshire Wildlife Trust and the remaining sections by Derbyshire Wildlife Trust.

The Nottingham Canal stop lock between the Cromford Canal and the Nottingham Canal is a wide beam stop lock. Although now gateless, this is the only surviving wide beam stop lock on the canal system.

There were only ever five such wide beam locks, which were generally used to separating the waters of two different canal companies. Two were rebuilt to narrow beam (Dundas and Kings Norton), the Braunston Lock was removed altogether in the 1930's and the Barnsley Stop Lock separated two canals that are now both derelict. This stop lock is therefore is a unique survivor.

3.1.4. Character Appraisal

Langley Mill itself has a sense of being a working industrious town and the canal here, with the ECDPA moorings and facilities including a dry dock maintain that atmosphere. The Great Northern Basin and the pub of the same name provide visitor amenities and a small amount of green space. The Great Northern Pub is one of only a few pubs actually adjacent to the canal in the entire length to Cromford. The Pub currently provides a destination at the end of the Erewash Canal, as boats do not go further unless they have moorings with ECP&DA.

It should be noted that there is no direct public footpath between this length and the former towpath north of the Stoney Lane Bridge.

3.2. Langley Mill (A 610) to end of infill

3.2.1. Condition of Canal Infrastructure

The first section of approximately 1km has been lost beneath the crossing of the A610 Langley Mill bypass. Little or no trace of the alignment survives south of Stoney Lane Bridge. It was not possible to legally gain access to the area between the A610 and Stoney Lane Bridge on the day of our Engineer's visit.

From Stoney Lane Bridge to the end of infill at the former LNER Bridge (SK 445505), the canal has been infilled but the line can be followed. A public footpath runs throughout this section along the line of the former canal. The line of the former canal can also be seen from field boundaries.

Line of canal north of Stoney Lane Bridge (between trees in centre)

North of Stoney Lane Bridge the line is initially obvious on the eastern edge of Aldercar Western Meadows Nature Reserve. The line of the canal continues on a shelf around 1 to 2m above pools in the Reserve until it

becomes indistinct in a flat area around 100m south of the site of the Erewash Aqueduct. There is a modern footbridge at approximately the location of the former canal aqueduct. The only visible evidence of any of the former canal structures north of the A610 on this section is some masonry in the river bed near the site of the former Erewash Aqueduct, although anecdotally we have been advised that the copings of lock 12 have been visible.

Footbridge over River Erewash near site of former aqueduct

North of the aqueduct site there is no sign of the line of the canal other than the route of the public footpath as it crosses two fields to reach Stoneyford Lane.

Line of canal climbing to pass in front of new house at Stoneyford Lane

The line of the canal crosses the frontage of a new house at Stoneyford Lane and continues within Erewash Meadows Nature Reserve. The current field boundary encroaches on the line somewhat for 200m north of the lane. This section is infilled but the alignment is obvious.

Line of canal clearly visible between field boundaries north of Stoneyford Lane

At SK 446 499 high tension electricity cables cross the line of the canal. The pylons are located well to either side of the canal, but the cables may be a constraint to some construction operations.

Just north of another boundary and the site of Slaleys Bridge, there are visible remains of Codnor Park Wharf on the west side of the line: these comprise stone waterway walls and the former waterspace is now a bog. We have been advised that there are significant tramway remains nearby.

Site of Codnor Park Wharf, some walls still extant and canal area marshy

The end of this section, at the abandoned and partially dismantled LNER Bridge (39) is also the northern limit of the Erewash Meadows Nature Reserve.

Between the current northern limit of navigation at Langley Mill and the LNER Bridge, there were six locks, raising the level of the canal from approx 57m AOD at Langley Mill to around 70m AOD at the LNER Bridge (therefore an average rise of around 2.2m).

3.2.2. Ecology/environment

The canal bed has been destroyed in this section.

Designated Sites

There are no statutory designated sites within 1km of this section.

The infilled route of the canal runs through the central and most southern sections of the Erewash Meadows Nature Reserve, the “Brinsley Meadows” and “Aldercar Flash” Sections (see Section 3.2.2 for background on the Erewash Meadows Nature Reserve).

Important Nature Conservation Features

The infilled route of the canal runs through Aldercar Western Meadows LWS and Erewash Meadows LWS, which are areas of floodplain meadows and wetland habitats. These form part of a wildlife corridor along the River Erewash of particular importance for passage migrant birds and breeding waders. Water bodies in these areas could support great crested newts and notable species such as common toad, grass snake and notable invertebrate and plant species. Water voles and white-clawed crayfish may be present on the Erewash and water voles could use the adjacent wetland habitats.

3.2.3. Heritage Assets

The canal along this length is completely lost and has virtually no value as a heritage asset. The only surviving visible remains are possibly the base of the piers for the Erewash Aqueduct. There are credible reports that some locks may simply have been buried

3.2.4. Character Appraisal

The canal has been lost along this length of the route, but assuming a reconstructed canal were somewhere near the original route the area is pleasantly pastoral with the sense that urban activity is never far away. Langley Mill is quickly left behind and once under the A610 the route is out of sight of any built up area. Some of the land is maintained by DWT as a nature reserve, however, land further from the canal that can be viewed from its course, and is probably outside the LWS, appears less well maintained. Overall, the countryside here is typical of many canal surroundings in the vicinity of large urban areas, and would not detract from the canal’s appeal given a suitable destination.

3.3. End of Infill to Junction with Pinxton Arm

3.3.1. Condition of Canal Infrastructure

From the LNER Bridge (39) northwards, the canal infrastructure largely survives, although the canal is generally silted to around the former water level and boggy, with much reed growth.

Course of Canal immediately north of LNER Bridge

Some water is discharged at the LNER Bridge via a V-notch weir located under a timber footbridge. The water flows by gravity into the Erewash Meadows Nature Reserve where it feeds the wetlands.

Footbridge with V-notch weir at site of LNER Bridge

At SK 444 513, Portland Basin Bridge (38A) carries the towpath over the remains of the entrance to the former Portland Basin. The bridge is in poor condition, with a section of the stone parapet missing. The basin was accessed via a short aqueduct over the River Erewash, of which very little remains. The basin itself has been infilled and is now a play area and a paddock.

Portland Basin Bridge – the arm to the basin passed under the bridge

The stone walls of Portland basin were excavated in 2009 and found to be in good condition, just past this basin is the remains of the former Lawn Bridge.

50m south of the entrance to the basin, a weir and spillway take water from the canal under the towpath and discharge into the neighbouring River Erewash. This flow is the vast majority of runoff which flows down from Golden Valley and the Butterley Tunnel into the upper section of the canal and into Codnor Park Reservoir.

Weir (centre) discharging into River Erewash

Between the Portland Basin Arm and the Railway Bridge (38) the west bank is lined with an extensive array of industrial building remains. These were formerly part of the Butterley Company's works, the greater part of which was demolished some years ago and the site was subsequently opencast mined.

Canal north of Portland Basin Bridge, with remains of Butterley Company wharf buildings on left

There are three locks on this section: Bottom of Flight Lock 7, Marshalls Lock 6 and Gas House Lock 5. All locks have the majority of stonework in-situ, but require extensive renovation. British Waterways cast concrete weirs in these locks in around 1960, that in Bottom of Flight Lock 7 being around 500mm high and the Marshalls Lock 6 around 1200mm high. Marshalls Lock 6 has 2 additional features; an old 7' beam dry dock, which is in a comparable condition to the lock structure, and a small bridge crossing at grade with the lock top stone course, providing a crossing point for a footpath. Gas House Lock 5 also has a concrete weir but part of the forebay on the offside has been demolished.

Marshalls Lock (No. 6)

Railway Bridge (38) appears to be in good order, being directly bordered to the south with Gas House Lock 5.

Gas House Lock (No. 5) and Railway Bridge

Above the Railway Bridge (38), the former canal is more obvious (this remains true up to Codnor Park Reservoir), being in a cutting, although it remains heavily silted and vegetated in places. There are 5 remaining structures between Railway Bridge (38) and the site of Top of Flight Lock 1.Smith's Lock 4 is the next structure along the route, est. 3m deep with an est. 500mm high weir. This lock is typical of all the present Codnor Park Locks – the majority of the structure (stonework) is in-tact, but requires extensive renovation.

A short distance from Smith's Lock 4 is Ironville Bridge (37). The bridge has visible services crossing on each approach face, with supporting ironwork. The bridge structurally appears in good order, with suspected re-pointing works having taken place in the last decade.

Ironville Bridge

Pottery Lock 3 (named after the very old pottery adjacent to the lock taken over by Denby Pottery in the 19th Century) abuts Ironville Bridge (37) to the north and again requires extensive renovation despite the majority of stonework being intact. This lock is an estimated 2m deep, with a weir present impounding water flow.

Pottery Lock (No. 3)

Approximately 50m north of Pottery Lock 3 is Lock No 2 Bridge (36). There are high retaining walls parallel (forming the eastern limits) with the towpath and joining the bridge at each approach. Both retaining walls are in need of attention, with perished mortar and 'holes' present. The actual bridge itself appears to be in a good condition.

Lock No. 2 Bridge, showing retaining wall above towpath

The penultimate lock which comprises the Codnor Park Lock flight is Boat Dock Lock (No. 2). This is estimated to be 2m deep and has intact stonework, although once again extensive renovation would be required to return the lock to full operation.

Top of Flight Lock 1 is no longer present, the highest of the Codnor Park Lock flight (7 in total).

Final section of channel towards Pinxton Arm Junction and Codnor Park Reservoir, in deep cutting to provide flood route for Codnor Park Reservoir

3.3.2. Ecology/environment

This section of canal is in water.

Designated Sites

There are no statutory designated sites within 1km of this section.

The eastern part of this section of canal lies within the “Cromford Canal Section” of the Erewash Meadows Nature Reserve (see Section 3.2.2 for background on this reserve).

The remains of Portland Basin are adjacent to the Jacksdale LWS on the east side of the River Erewash.

Jacksdale LWS

The site covers 5.3 hectares and is a mixture of woodland scrub, railway embankment, rough grassland and riverbank. The old railway embankment was donated to the Trust by British Rail. The reclaimed tip and riverside area owned by Ashfield District Council and a small area of grassland owned by Severn Trent Water are managed by the Trust under licence. The site is designated as a Local Nature Reserve.
The reserve consists of scrub and colonising vegetation on the disused railway line with grassland dominating the rest of the site. An area of new woodland was also planted some years ago.

The larger part of the reserve is an embanked plateau, created by the restoration of an old domestic refuse tip in 1974. The plateau, originally intended for sports use, was managed as rough pasture. This grassland tends to become waterlogged in winter and as a result many moisture-loving plants thrive here. The banks of the River Erewash form the western boundary of the reserve, and the river occasionally floods the bank-side grasslands. Willow and birch dominate the woodland scrub, with yellow iris, meadowsweet and reedmace growing in the small marsh area in the south eastern corner.

Meadow brown, common blue, small tortoiseshell and peacock butterflies feed on the knapweed, vetches, trefoils and burnet in the grass sward. Birds to be seen include kestrel and skylark over the plateau, and kingfisher flying along the river. The river corridor forms a natural flight line and various species of birds can be seen during migration periods.

Conservation Management

The main objectives are for creative conservation. The aim is to protect and care for the young trees, to increase the species richness of the grassland and marsh communities and to encourage the reserve's use as an outdoor classroom by local schools.[13]

Important Nature Conservation Features

The route of the canal passes through urban and farmland areas and some woodland (Sidings Wood being located to the west). The canal is partially watered and along with the River Erewash, forms a marsh/swamp community of importance for species such as water voles. The margins are populated with trees and scrub, which are likely to be a locally valuable nature conservation resource, particularly as a wildlife corridor.

3.3.3. Heritage Assets

Much of the heritage that survives on this length but has been degraded by historic neglect, which is now in part halted by maintenance of those structures managed by DWT to prevent further deterioration, and by work parties from FoCC elsewhere. In addition the flood relief works for Codnor Park Reservoir have resulted in the total destruction of the canal track from the reservoir to Lock 2, including the complete removal of lock 1 and the removal of the top cill from Lock 2. Locks 3 to 7 survive but have been damaged by neglect and subsidence.

Between Locks 5 and 6 are the remains of a canal house and workshops.

The high retaining walls below Lock 2 are unusual in being constructed with local blast furnace slag. The use of furnace slag in construction was very unusual at the time the wall was built, use of "secondary aggregates" in construction being a modern phenomenon

3.3.4. Character Appraisal

As the urban area of Ironville and Codnor Park is reached, the surrounding fields become increasingly unkempt (although it is recognised that these may provide better habitat and a more biodiverse ecology) and towards the north end of the locks, buildings take their place. This area could, assuming there are no subsidence issues, benefit from an improved canal as a focus for new development. Codnor Park Locks climb through an urban area with a distinctly mixed character, some historic buildings dating from the time of the canal, some terraces from the industrial era and some modern housing. It is notable however that there is virtually no vandalism or graffiti in the area, and the walk up the locks, while occasionally bleak (not helped by the 1970s works to turn the canal into a flood relief channel) never feels insecure.

3.4. Junction with Pinxton Arm to Butterley Tunnel Eastern Portal

3.4.1. Condition of Canal Infrastructure

The entire Cromford Canal above Top of Flight Lock 1 and also all of the Pinxton Arm was constructed on a single level, at about 83m AOD, although the remains of the canal may not correspond to this level everywhere due to the effects of mining subsidence. The available water supply was supplemented by the canal summit pound being excavated two feet deeper than the other pounds.

Codnor Park Reservoir formerly retained 33,000,000 gallons. It was constructed to provide water down the flight to Codnor Works below Lock 4. On the downstream side of the Pinxton Arm to the north of the bridge is

[13] Information on Jacksdale LWS is from Nottinghamshire Wildlife Trust's website.

a tunnel to an outlet valve under the Arm, the stone banked dyke also connected to an overspill weir which was on the corner by Top Lock Bridge. After about thirty yards the stone sided dyke goes into a culvert which discharges back into the canal under the bridge downstream of Lock 3.

The reservoir is understood to have been historically maintained at the level of the canal summit pound. British Waterways undertook significant works in the 1970s or 1980s as a requirement of the first inspection after the introduction of the Reservoirs Act in 1975. A weir at the inlet and a new discharge weir at south east mitre of the dam were constructed, enabling the water level to be lowered by about 1.2 metres.

Codnor Park Reservoir Outlet Weir – canal was located where car park is

At the same time the former canal channel was severed at the location of the visitor car park, and significantly deepened below this point down to Boat Dock Lock 2 to ensure satisfactory conveyance of flows in extreme flooding events away from the dam[14]. This work resulted in the total loss of Top of Flight Lock 1. The severance and absence of Lock 1 forms a significant obstacle to the restoration of a connected[15] navigation beyond this point.

West of the reservoir car park, the canal bed is obvious between Coach Road and the south bank of the reservoir. The towpath forms a bund which separates the canal from the reservoir. The canal is silted to roughly the old water level and is boggy, with much reed growth.

[14] Information kindly provided by David H Brown, Chief Reservoir Engineer, British Waterways
[15] This is meant in the sense of having a connection to the remainder of the national canal network.

Canal; bed alongside footpath (reservoir is just to the right) looking towards car park at upstream end of reservoir

At the west end of the reservoir the canal bed is again lost, for around 50m, under a car parking area. This appears to be disused. Immediately to the east lies a small basin-like area of the canal with the new inlet weir mentioned above. This has a footbridge which carries the towpath across the reservoir inlet.

Reservoir inlet weir and footbridge

The canal bed from here is intact through Golden Valley to the eastern portal of Butterley Tunnel. The steep sided section along the frontage of the “Stone Row Cottages” was restored in the late 1970s, provided with timber bank protection, and dredged sufficiently that no reed or weed can be seen on photos from the era. It is now silted again with silt between 0.1m and 0.4m below the surface and significant reed growth in the channel.

The Butterley Company Bridge (35), a foot/pipe bridge, crosses the canal in a single span with more than adequate air draft. It is fenced off and signed “Keep Off – Dangerous Structure”. The bridge appears to be structurally sound but the parapet handrails are broken or missing in places.

Butterley Company Bridge

Newlands Road was formerly carried over the canal by Golden Valley Bridge (34). The bridge was buried as part of road works which raised the level of the road significantly, and the road now appears to be carried on an embankment across the line of the canal. A concrete culvert with steel screens enables water from the west side of the road to discharge into the canal east of the infill.

Site of Golden Valley Bridge (infilled)

The short length of canal bed from the Newlands Road embankment to the Butterley Tunnel east portal is intact and in water. This section is owned by The Midland Railway Centre and was partially dredged by them

in around 1999. At that time the silt at the tunnel end was about 0.4 metres above water level. The canal has re-silted over the years, leaving a water depth of between 0.1 to 0.4m. The canal here is in cut, with large trees growing on the bordering embankment, some of which have fallen into the canal.

Canal between Golden Valley Bridge and Butterley Tunnel East Portal

East of the entrance to the Butterley Tunnel east portal, there are two spillways. The wider of the two spillways (north) is in use, with a stream cascading down the structure. This carries water that used to feed Butterley Park Reservoir. The second spillway (south) once brought water from the now dry Butterley Park Reservoir into the Cromford Canal.

Tunnel East Portal and spillway

Access into Butterley Tunnel via the eastern portal is prevented by a metal grill arrangement with locked hinged opening. The tunnel entrance brickwork/stonework is in a fair condition, although there are areas of

missing brick/stone/mortar, and surface cracks in places. When researching older images of the tunnel entrance, it appears that significant vegetation clearance has been undertaken in the locality in the recent past.

3.4.2. Ecology/environment

This section of canal is in water, except for the length alongside Codnor Park Reservoir, where the canal channel has been diverted into the reservoir.

Designated Sites

There are no statutory designated sites within 1km of this section.

The eastern part of this section of canal lies within the Erewash Meadows LWS. Codnor Park Reservoir and the canal west to Codnor Lane are designated as an LWS and the section of canal between Codnor Lane and the Butterley Tunnel lies within the Midland Railway Country Park LWS.

Erewash Meadows - LNR

See Section 3.1.2 for background on the Erewash Meadows Nature Reserve.

Codnor Park Reservoir - LWS

Codnor Park provides nature walks as well as a well-stocked reservoir, fed by the Cromford Canal, for the customers of Codnor Park Fisheries.

Midland Railway Country Park - LWS

The Midland Railway Country Park was acquired by the Midland Railway Trust in the 1980s. Its wildlife, which attracts many visitors, has been protected by the planting and clearing of trees and damming of a stream to create two lakes. The Cromford Canal passes through the eastern end of the park.

Important Nature Conservation Features

The route of the canal passes through urban and farmland areas and some woodland. The canal is partially watered and forms a marsh/swamp community of importance for species such as water voles. The margins are populated with trees and scrub, which are likely to be a locally valuable nature conservation resource, particularly as a wildlife corridor. Water vole and white-clawed crayfish are known to be present along this section of the canal, particularly within Codnor Park Reservoir, which the canal passes through. On the main connected canal system white clawed crayfish have proved vulnerable to competition from the American signal crayfish.

The Midland Railway Country Park provides habitat for many different species, including Heron fly, woodpeckers and the wild plant Dog's Mercury, an indicator species of ancient woodland.[4]

3.4.3. Heritage Assets

The canal track has also been infilled past the reservoir as the water course has been diverted through the reservoir.

The canal in the Golden Valley is included in the Golden Valley Conservation Area.

3.4.4. Character Appraisal

At the top of the locks Codnor Park Reservoir is reached, and this makes an attractive prospect. The area is popular with locals and the canal here is actively used as a local recreational facility. Again, vandalism is notable by its absence. It is easy to imagine the canal alongside the reservoir being a reasonably popular mooring if the canal were reopened, although the lack of a pub in the area hinders this to some extent.

Once past Codnor Park Reservoir, the canal is flanked by houses one side and a local road on the other, and gradually enters a cutting which gets deeper and deeper until the east end of Butterley Tunnel is reached. Although not unattractive this length is the sort of area that boaters would pass through on the way to somewhere rather than a terminus although the Golden Valley Light Railway (the Midland Railway Centre's narrow gauge railway line) may make a destination for some. The closure of the pub is unfortunate but we are advised that it may reopen, increasing the appeal of reaching this location.

The OS Map marks a railway station here but this is on the Golden Valley Light Railway which is part of the Midland Railway Centre. It could provide a complementary tourist attraction with the canal, the Midland Railway Centre and other local heritage items such as Codnor Castle and the Jessop Monument.

4. Central Section
Butterley Tunnel to Transco

4.1. Butterley Tunnel

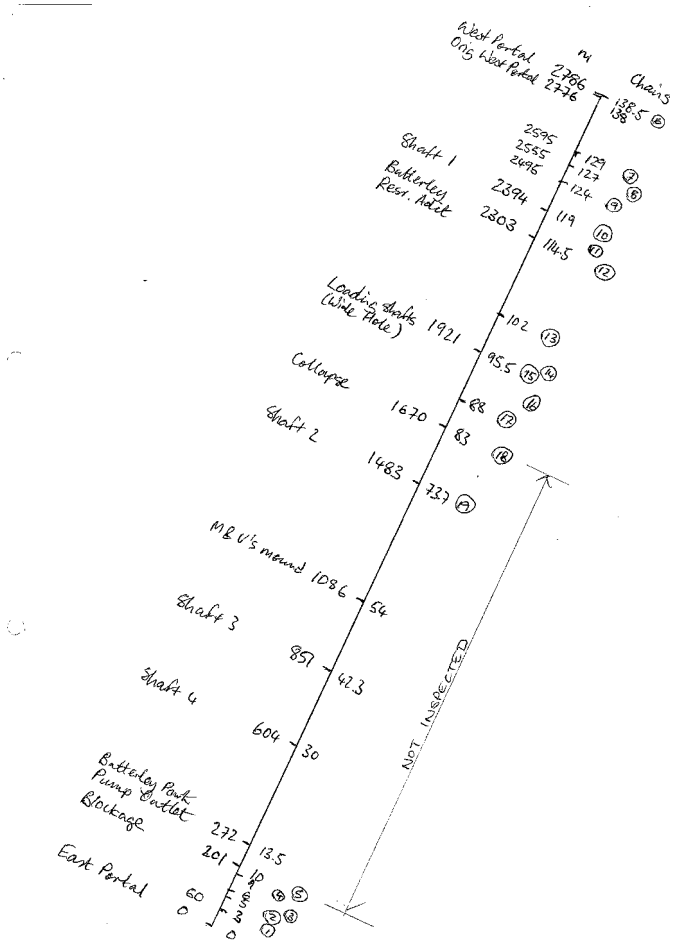
4.1.1. Condition of Canal Infrastructure

The following text is based primarily on an unofficial survey carried out in November 2006. A report of this survey is published on the website of the Friends of Cromford Canal (also available via http://www.tinajuliecordon.webspace.virginmedia.com/Butterley%20Tunnel%20Survey.pdf).

Butterley Tunnel was originally 2,712m long, 2.7 m wide at water level, and 2.4m high from normal water level to soffit. At the time of building (1794) it was the third longest canal tunnel in the World after Sapperton and Dudley.

The tunnel has been extended twice at the western end: in the 19th century it was lengthened to accommodate railway construction, and later, in the 20th century, to facilitate construction of the A38 Ripley Bypass. The latter extension is not sized for navigation. The tunnel is now around 2,780m long.

The tunnel is shown schematically on the diagram below:



From the eastern portal, the tunnel survives intact at least as far as a blockage of debris (feature no. 5 on the diagram) around 200m in. Several lengths of the brick lining are supported by timber shorings in this initial section. Some of the shorings are cross braced very close to the original water level. The debris blockage extends almost to the full height of the tunnel. From photographs the soffit lining of the tunnel seems intact beyond the blockage and further shorings can be seen. However, neither the 2006 survey, nor an earlier expedition in 1979 was able to progress beyond this point.

There no record of the next 1,470m of the tunnel having being inspected since closure of the canal. It is not possible to comment on the condition of this section. Water can be seen at the bottom of Ventilation Shaft 2. This shaft is located 1,483m from the western portal and appears to be in reasonable condition.

1,670m from the eastern portal timber shorings have collapsed (18 on the diagram) and photos suggest an apparent lining collapse. This point marks the limit of the 2006 survey from the eastern portal, and is 1,116m from the current western end of the tunnel. There is relatively little water in the eastern part of the tunnel in dry weather conditions.

100m further to the west, there is a bulge in the lining in the soffit of the tunnel, and also an area of poor brickwork close to water level (16). Between here and the Wide Hole (1,921m from the eastern portal) a section of tunnel has been shored with timber and the bed is infilled with rubble to approximately original water depth (17). This may have been done to stabilise movement.

The Wide Hole itself (14 and 15) is an area of complex interconnecting passages and shafts which used to connect Carr Pit to the canal. There is an area of wharfage where the tunnel is considerably wider, hence the name of this area. Generally the canal lining is in good condition in this area, although there is a short section of shoring around 20m west of the widened section.

2,303m from the eastern portal (and 483m from the modern west portal), an adit (12) feeds water from Butterley Reservoir into the north side of the tunnel.

There are more lengths of timber shorings either side of Ventilation Shaft 1 which is located 2,394m from the eastern portal.

At around 191m from the modern western portal, the original tunnel ends, and the railway extension from this point is higher, and supported with iron shorings (7). This construction continues to the end of the navigable tunnel. The last 20m of the tunnel is the A38 extension, made in a circular section corrugated steel culvert of around 1.7m diameter (6).

Water can be observed flowing from the Butterley Reservoir adit to the western portal – in general the water depth in this section suggests that water is close to the old canal water level.

4.1.2. Ecology/environment

This section consists of the Butterley Tunnel, which carries some water, but is not navigable.

Designated Sites

Hammersmith Meadows Local Nature Reserve (LNR) lies adjacent to the route of the Butterley Tunnel to the north of Ripley. Carr Wood LNR lies approximately 300 m south of the tunnel. The route of the tunnel passes along the edge of a LWS at the Golden Valley Caravan Park in the east and through the southern end of Butterley Reservoir LWS.

Hammersmith Meadows - LNR

These fields are very important for their nature conservation interest. They contain over 77 species of plant, including some locally uncommon species.

This site is important as the land hasn't been improved by re-seeding, or been treated with fertilizer, which means that there is more opportunity for a wider variety of species to grow than just grasses like perennial rye.

Carr Wood - LNR

Carr Wood comprises of nearly 4 hectares of mixed woodland and unimproved grassland, its proximity to Ripley town centre give it added value both as a haven for wildlife and as a place for local people to enjoy. Since the 1920's it has largely been left to naturally regenerate and the result today is a mixed and varied woodland that is home to wide range of native flora.

Important Nature Conservation Features

There is potential for the tunnel to support roosting bats.

4.1.3. Heritage Assets

Butterley Tunnel was the eighth longest canal tunnel constructed in Britain, out of a total of around fifty. This makes it notable but not remarkable. Of those longer, only Standedge (Huddersfield Canal) and Dudley (Dudley No. 1 Canal) are still in use. Both have significant constraints on their operation in terms of the type of vessel that can use them and the safety of their operation. Of comparable length are Blisworth, Netherton and Harecastle Tunnels, all of which are brick lined. Blisworth and Harecastle also have no towpath and Harecastle is narrow beam, like Butterley. Thus while Butterley Tunnel is an interesting feature on the Cromford Canal it is hard to make any claim that it is of wider significance than this other than for presence of the wide hole

This is an unusual piece of heritage within the tunnel. If possible this should be retained as a heritage asset (although providing safe public access may prove to be impractical), and interpreted in a safe manner to explain better the context of this feature of the canal. It should be noted that both the Golden Valley Light Railway (see section three) and the terminus of the standard gauge railway at Hammersmith are located near the portal nearest the Wide Hole, and if any visitor attraction is made of the wide hole then both attractions could be visited in one trip

4.1.4. Character Appraisal

The character of Butterley Tunnel would very much dependent on the form of any restoration: whether the old bore is restored, whether a new bore is created, or whether a diversion is made. One immediate note about the effect of a diversion on the canal overall is that the journey from the Trent to the east portal of the tunnel already consists of 28 locks in 15 miles. Adding a significant number more to reach Cromford could well be off-putting.

Canal tunnels are not to everyone’s taste. Some boaters love them, others avoid them. The original tunnel was a fairly cramped bore even for a narrow canal, In Bradshaw 1904 it is identified as having a minimum height above water of 8 feet 3 inches and a minimum width at water level of 9 feet. This would give most modern narrow boats around 2 feet 6 inches clearance over the cabin (some less) and a foot down each side. The 1904 details also state “the figures of minimum height of the tunnel above water level are not to be depended on, as subsidences in the tunnel are continually taking place and the brick lining of the tunnel is in a very indifferent condition”. Rodolph de Salis based this on his transit of the tunnel in 1898 and also comments in 1904 that “…the tunnel is currently closed…” In other words, Butterley Tunnel was not in a good state of repair 113 years ago, and its condition can be expected to have continued to deteriorate since abandonment.

A 3 kilometre long tunnel with a bore this tight will be off-putting to some boaters, but most of those would also be put off by any tunnel. The bigger issue is the capacity constraint that would be imposed. A modern narrow boat would be very slow through a tunnel of this bore, which is even tighter than Harecastle Tunnel on the Trent and Mersey Canal, and one way operation would be necessary.

It should be noted that there is a public footpath over the tunnel. This may well follow the old horse path, the route the horses would have followed to get over the tunnel and be reunited with their boat at the other end.

4.2. Butterley Tunnel Western Portal to A610

4.2.1. Condition of Canal Infrastructure

The western portal of Butterley Tunnel is now demarked with a culvert headwall – the original western portal was built over when the A38 was constructed, and the tunnel in effect 'extended' where the new trunk road was to be located. The culvert is estimated to be two metres" in diameter, and extends some 20 metres under the A38.

Canal between A38 and A610, looking back towards Butterley Tunnel West Portal and the A38 road

The canal route along this section is in cut – this is likely to be deeper in parts than when originally constructed given the re-alignment of the A610 in the last half century. The canal bed is, on the whole, intact and in water, although some areas have been affected by land slips and infilling, creating bottlenecks. There is significant vegetation along this route length, mainly in the form of semi mature/mature trees. The canal itself is heavily silted and weeded, with a depth between 0.1 and 0.3m. A pipe bridge is located some 50m (est.) west of the western portal, but has more than sufficient height to allow boats to pass (est. 3m+).The pipe bridge appears to be structurally sound. Waterway walls are in evident towards the A610 end of the section, and may be present along the majority of the route, but buried. The A610 embankment which demarks the end of this section length is a major new obstacle – the canal terminates here, with water flowing into a culvert under the A610. The Hartshay Brook runs parallel with this section of canal, and is also culverted under the A610 embankment.

Well preserved but silted section of canal

East end of culvert under A610

4.2.2. Ecology/environment

The canal bed is intact in this section with some parts in water.

Designated Sites

There are no statutory designated sites within 1km of this section.

This section of the canal is designated as a LWS.

Important Nature Conservation Features

The canal passes through dry woodland habitat and runs adjacent to Hartshay Brook. The canal here is in water and vegetated. The canal could support notable or protected species including water vole and white-clawed crayfish.

4.2.3. Heritage Assets

Although the canal bed is visible and intact here, there were no significant structures on this length. Both the A38 crossing (an extension of Butterley Tunnel) and the A610 crossing postdate the canal's closure.

4.2.4. Character Appraisal

The canal holds some water in this length and is in a wooded cutting. The character is fairly typical of tunnel approaches and would be very much as any boater or walker would expect.

4.3. A610 to Chesterfield Road

4.3.1. Condition of Canal Infrastructure

The culvert headwall within the A610 embankment at the start of this section is not visible due to dense scrub vegetation, but water is flowing from the headwall. There is a service crossing at the bottom of the embankment almost at grade with the canal which would require relocation/alteration/diversion in the event of canal restoration. The canal bed leading to the small hamlet of Lower Hartshay from the A610 embankment is intact, but not in water. There is dense marshy vegetation along the intact route section (generally reeds and rushes), with trees and scrub vegetation also embedded towards the Lower Hartshay end. The southern canal bank has a towpath, which is now used as a public footpath, and a waterway wall is visible along the entire bed length. The waterway wall appears to be of concrete construction, and comparatively modern in appearance – although there is evidence of gradual overturning in places, with the waterway wall leaning into the canal.

Canal between A610 and Lower Hartshay

The first structure along this section heading west is the Ripley Road Bridge (32). This bridge was constructed in the 1930s by the London, Midland and Scottish Railway and is of concrete and steel beams. The bridge itself appears to be in good condition. The constraints at this structure are the numerous service

crossings (in troughs at grade with the canal and on separate overhead pipe bridges) either side of the bridge, some of which would need relocation/alteration/diversion in the event of canal restoration.

Ripley Road Bridge

The canal bed disappears prior to arriving at Lower Hartshay, with any water contained within intact bed sections discharging via a side culvert into the Hartshay Brook, which runs almost parallel to the north of the remaining canal line. The actual line of the canal in terms of 'available land' from Lower Hartshay to Chesterfield Road appears to remain (bar the section built over by the Excavator Public House), however the line is not distinguishable along the majority of the section, having been filled in and destroyed.

A number of bridges are present along the former canal line from Lower Hartshay to the Chesterfield Road, namely, Starvehimvalley Bridge (29) and Railway Bridge (28). Malthouse Bridge (30) once lay between Starvehimvalley Bridge and Hartshay Bridge but has been destroyed. Hartshay Bridge was observed on this remaining short section – the bridge coping stone and separate service crossing being the only visible remains of the structure that has been infilled and buried with the canal bed. This would have been bridge 31 demolished and in filled in the 1960's the large diameter pipes follow the profile of the original bridge.

Pipe Bridge and parapet stones marking the site of Hartshay Bridge

Starvehimvalley Bridge sits in the middle of a fishing lake created in the old canal bed.

4.3.2. Ecology/environment

The canal bed is intact in the eastern part of this section and destroyed in the western part.

Designated Sites

There are no statutory designated sites within 1km of this section. The western half of this section is designated as a LWS as are pools at Pear Tree Farm and woodland at Buckland Hollow in the eastern part of this section.

Important Nature Conservation Features

The canal in this section is mostly unfilled and passes through farmland which supports a number of pools and wetland/marshy grassland habitats. The canal route is likely to form a valuable wildlife corridor. These habitats are worthy of further investigation.

4.3.3. Heritage Asset

The Starvehimvalley Bridge, albeit restored, is a good example of a typical masonry canal bridge of the type seen further west between Ambergate and Cromford. Elsewhere Hartshay Wharf House survives as does one of the former wharves (there were at least three wharves at Hartshay).

4.3.4. Character Appraisal

This length passes through the pleasant rural area around Hartshay; by and large the canal has disappeared so there is little of interest for the visitor to see. If the canal were reinstated this would make pleasant but unspectacular cruising.

The Excavator public house would be canal side if the canal were reinstated.

4.4. Chesterfield Road to Brickyard Road

4.4.1. Condition of Canal Infrastructure

The canal bed from the Excavator Public House to the Buckland Hollow tunnel entrance is no longer intact, with the Excavator Public House car park appearing to be sited directly on the line of the canal. A public footpath leads from the Public House car park to the tunnel entrance and then through the tunnel. The tunnel appears to be in good order, although the stability of the bordering cliff faces on both sides of the tunnel requires investigation – more from a user health and safety perspective than in relation to the structural stability of the tunnel itself. The canal bed within the tunnel has been infilled, possibly not by design. The towpath is flagged through the tunnel.

Buckland Hollow Tunnel

Heading west from the Buckland Hollow tunnel following the public footpath in the direction of Sawmills, the canal bed is not evident for the first 50m, the first point being where the footpath is bordered by small dwellings and workshops to the south. From this point 800m west (before cottages on Sawmill approach) the canal bed where evident appears dry, and is infilled or silted and vegetated with scrub / self seeding trees. In places, the canal route is almost indistinguishable due to being at grade with the adjoining ground levels. The canal in this section is bordered to the north by the A610 Ripley Road and to the south by a dismantled railway (the former Ambergate and Pye Bridge branch, which is sited on an embankment of which the toe forms the southern canal boundary). A substantial retaining wall has been erected just west of Buckland Hollow tunnel. This is likely to have been constructed as part of the former railway supporting structures. The wall itself appears to be in need of attention, with missing stones and vegetation (both scrub and trees) growing from its face.

Heading west, approaching and passing the first line of cottages before entering Sawmills and the Brickyard Road area, the majority of the canal bed has been lost where cottages have either extended gardens or car parking areas to the toe of the bordering southern railway embankment. The public footpath, which generally follows the route of the canal throughout, is still routed behind the cottages intersecting the extended gardens.

Encroachment onto the canal bed

Where the row of cottages ends, there is a small area of green space before a private estate road. The canal bed, of which a small, dry length is apparent just west of the cottages within the aforementioned green space, is lost completely where it has been cut by the private estate road and estate unit car park, a length in the region of 100m to Brick Yard Bridge (26), where the now defunct Brickyard Road used to pass over.

End of the remains of the canal track just east of estate road and car park

4.4.2. Ecology/environment

The canal bed is intact in this section, but not in water.

Designated Sites

Ambergate and Ridgeway Quarries SSSI lies approximately 450 m south of the route of the canal. Much of the route of the canal within this section is designated as a LWS. Graves Wood, an ancient (replanted) woodland, is also located between Buckland Hollow and Bullbridge.

Ambergate and Ridgeway Quarries SSSI

These two quarries provide very important exposures in rock of Westphalian age (Upper Carboniferous). The section exposed at the largely infilled Ambergate Quarry displays the best available exposure of the Belperlawn Coal and the sediments associated with that unit, the lowest economically viable seam in the Pennines coalfields. This section is principally of interest because it shows sediments originally laid down in front of the delta, whose sands formed the Crawshaw Sandstone Formation. This Formation is present in the nearby Ridgeway Quarry and is the lowest major sandstone body in the Westphalian rocks of the southern Pennines. The Crawshaw Sandstone Formation also has considerable economic importance as a gas and oil reservoir. Ridgeway Quarry shows the sandstone lying with an erosive base on the Gastrioceras subcrenatum Marine Band, the internationally recognised base of the Westphalian Series. The sandstone body itself has strongly developed planar cross bedding and is interpreted as a fluvial channel deposit. Both Ambergate and Ridgeway Quarries provide a valuable insight into the patterns of deposition of these economically important Carboniferous sediments.

This SSSI is in an unfavourable recovering condition, with an agreement now in place to re-expose the marine band, and improve access.

Important Nature Conservation Features

The canal in this section is unfilled and for the most part vegetated with woodland and scrub habitats which form part of a corridor of woodland habitat along the A610, connecting to woodland and hedgerows to the south.

4.4.3. Heritage Assets

Buckland Hollow Tunnel survives and carries a public right of way. Curiously, given the conclusion that Butterley Tunnel is of limited interest, Buckland Hollow, Gregory and Hag Tunnels are of more (although still mainly local interest). Buckland Hollow Tunnel is just 29 metres long but is intact and passable on foot. In addition, such short tunnels were very unusual, this one is to pass through a rocky outcrop and does beg the question of why not go round the outcrop or create a cutting similar to those on the Shropshire Union Canal. The answer probably lies in the presence of Chesterfield Road, which would have been present when the canal was built and would have needed a bridge in any event, and that the Cromford Canal was built some 40 years before the Shropshire Union, with engineering techniques less well advanced

4.4.4. Character Appraisal

This length starts at the Excavator one of only 3 canal side pubs, is situated alongside both the canal and the busy A610 and offers a suitable stopping point. Buckland Hollow Tunnel can be seen from the pub car park and has a right of way through it. Immediately beyond this the canal moves away from the road again, initially occupied by a business but then the track is clear although largely infilled. Heading towards Cromford, the surrounding scenery begins to change to give an indication that the canal is approaching the Peak District

4.5. Brickyard Road to Transco

4.5.1. Condition of Canal Infrastructure

This section of canal starts at Brick Yard Bridge (26). This bridge comprises of 4 (visible) stone arches, and used to be the access to the Ambergate Brick and Tile Works. This old access has been made redundant with the construction of a private estate road, and the bridge now carries a footpath only. Brick Yard Bridge

appears to be in a fair condition; with reasonable headroom for canal restoration under all of the arches (if an alternative arch than the original 'line' nearest the A610 is taken under the structure).

Brick Yard Bridge

The route of the canal continues west from Brick Yard Bridge, bounded to the north by a mixture of cottages and newer dwellings in Sawmills, and to the south by the dismantled railway embankment. Following the A610, the land to the north, begins to fall away slowly, creating a terrace in effect, with the canal sitting 'mid terrace' between the houses (bottom) and dismantled railway (top). Unlike the previous Chesterfield Road to Brickyard Road section, the majority of the canal line through Sawmills remains unobstructed.

The canal bed has either been infilled or silted up over time, and varies in depth of between 100 to 500mm. The canal bed is also heavily vegetated with scrub and trees, the latter being semi-mature, significant specimens. There appears to have been some recent tree clearance works in the vicinity of the canal directly behind dwellings at Sawmills. There is a stone structure midway along this small section which was a 'gauging' narrows. The structure is in a dilapidated state, although the majority of stone used in its construction remains in situ.

Gauging Narrows at Sawmills

The only significant obstruction is a garden which has encroached on the canal line approaching the former aqueduct crossing.

Encroachment at Sawmills

As the canal passes through Sawmills, the route shifts north into Bullbridge. The northern turn used to be directly onto an aqueduct, which took the canal over the main road (now A610), railway line and river Amber. The “aqueduct” was actually a combination of a narrow embanked section of the canal across the valley and a number of bridges carrying the canal over various obstructions beneath.

This structure was numbered as below:

- Bridge 25 (southernmost span)
- Bridge 24 – Culvert Bridge (the A610 road passes under)
- Bridge 23 – Railway Bridge
- Bridge 22 – River Amber Bridge (still extant)
- Bridge 21 – Bull Bridge – over Drovers Lane
- Bridge 20 – Towing Path Swing Bridge

The A610 Bridge was demolished in the 1960s; a stone abutment plinth remains to mark the original rail bridge crossing. A flight of timber steps is now provided at the end of the canal alignment to enable users of the public footpath along the canal to descend to road level.

The towing path swing bridge was a small structure, remnants of which are now on the wharf at Cromford. This gave access to the offside (east) of the canal along the crest of the “aqueduct”. North of the railway line part of the approach embankment remains.

The canal then continues in water in pleasant surroundings for a few hundred yards before the next bridge, Bull Bridge, which has been partially infilled and carries services on both arch faces.

Section of canal in water between Sawmills and Bull Bridge

Bull Bridge

Beyond Bull Bridge, the canal bed has been lost beneath Stevensons' and the Transco Yards. One portal of Hag Tunnel is extant in Stevenson's yard.

4.5.2. Ecology/environment

The canal bed has been largely destroyed in this section.

Designated Sites

The Cromford Canal is designated as a SSSI and LNR from the western end of this section (see section 5.1.2 below). Ambergate and Ridgeway Quarries SSSI (see section 4.4.2) lies approximately 500 m to the south of this section. Woodland and grassland areas immediately to the north of the Transco Plant at the western end of this section are designated as LWSs.

Important Nature Conservation Features

The canal in this section has been unfilled and forms a corridor of trees and scrub through the village of Bullbridge. The Transco Depot separates the route through Bullbridge from the Ambergate section to the west. The LWSs to the north of the Transco Depot comprise acid grassland and ancient woodland habitats.

4.5.3. Heritage Assets

The canal along this length is largely destroyed but some significant remains exist. The embankment leading to the railway and road crossings survives, as does the culvert under it for the river Amber and an arch to accommodate a minor road. The only trace of the road and rail crossings is the footings for the rail crossing abutments. These do give some interpretation of what was once there. At Bullbridge, a length survives in water and appears to be in good condition. There is a masonry arched bridge over the western end, which is a listed structure. Surviving remains of the Bullbridge Aqueduct can also be seen.

4.5.4. Character Appraisal

This length has seen considerable damage to the canal track. The track of the canal is at first surrounded by woods and almost oblivious of the urban developments that surround it. The site of the former aqueduct over the A610 is reached. The road and the railway can be crossed on the level and the section of the structure over the River Amber is still in place. A public footpath follows the embankment towards Cromford, where houses have actually been built on the embankment. These are desirable homes, but nevertheless the combination of the missing structure and these houses presents a formidable obstacle.

The canal then continues in water in pleasant surroundings for a few hundred yards before the next bridge. The Canal Inn is here, one of only four pubs that can make a claim to be canal side on the route, the others being the Great Northern at Langley Mill, the Excavator Inn at Buckland Hollow and The Boat Inn at Pinxton. Beyond the bridge the canal is lost in Stevenson's Yard, any future redevelopment proposals for Stevenson's would provide an opportunity for the canal to be re-instated. Stevenson's Yard includes one portal of Hag Tunnel. It is not clear whether the other (western) Portal survives. The canal bed is buried in succession by Stevenson's Yard and then a Transco Depot, before emerging at the start of the Western Section.

5. Western Section

5.1. Ambergate to Cromford

5.1.1. Condition of Canal Infrastructure

Starting from Transco, the canal is in water from here to a point some 500 metres short of Lea Wood, a distance of approximately 6.4km. The structures throughout are sound, and there is currently minimal evidence of leakage. The canal is “stopped" in several places, with either stop planks at narrows provided for the purpose or fabric barriers across the canal. The fabric barriers are to prevent the spread of non-native plant species e.g. azola. The level is constant throughout suggesting that water seeps past these stops.

Much of this length is much silted, often to within 100mm of the surface and occasionally silt has risen above the surface where a field drain comes in. The County Council is maintaining this length in a manner consistent with its designation as an SSSI[16].

The canal dries out around 500m short of Lea Wood Aqueduct, including the length over the railway Aqueduct. It is understood that the canal flooded here several years ago, and the bank was weakened risking a breach. The Aqueduct has been drained following an inspection and remedial work is in hand. When this is completed this whole section will be rewatered.

From Lea Wood to Cromford Wharf the canal is generally in good condition. At the time of the site visit leakage at Cromford was evident and work was ongoing to resolve this. The canal appears clear and a dipping survey has recently been undertaken. We are advised this section is not, however, navigable at present.

5.1.2. Ecology/environment

Designated Sites

The nearest compartment of the Peak District Dales SAC lies approximately 450 m to the North of Cromford Wharf. The Cromford Canal in this section is designated as a SSSI and LNR, primarily because of the plant communities and rare plant and invertebrate species that occur in the canal due to complex water chemistry. The margins and adjacent habitats also include important woodlands and wet grasslands which are designated as LWSs and support notable assemblages of invertebrates and birds. Shining Cliff Wood SSSI lies approximately 125 m to the west of the canal on the opposite side or the River Derwent and the A6.

Cromford Canal SSSI

The site consists of approximately six miles of disused canal running from Cromford to Ambergate. It has been selected as an example of a Eutrophic freshwater habitat with a rich submerged and emergent aquatic flora and a diverse marsh-wet grassland margin which supports a very rich insect fauna.

The canal is fed at Cromford by water from the Carboniferous Limestone but for the most of its length there are small feeders of more acidic water from the shales and gritstone. This variation in water chemistry has resulted in a range of plant communities. The canal is sufficiently shallow to be occupied to its full depth by rooted aquatic plants. The most widespread is broad-leaved pondweed Potamogeton natans. Where there is sufficient light penetration rigid hornwort Ceratophyllum demersum and Canadian pondweed Elodea canadensis are locally abundant. Curled pondweed Potamogeton crispus is also present and apparently increasing with water starwort Callitriche ssp. occupying a more marginal position where the reedswamp

[16] Details of the designation can be found at:
http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000209.pdf

communities are suppressed by shade from overhanging trees. Several rarer aquatic plants have been recorded including grass-wrack pondweed Potamogeton compressus, small pondweed Potamogeton berchtoldii, various-leaved pondweed Potamogeton gramineus, the rarer of the two hornworts Ceratophyllum submersum and round-leaved crowfoot Ranunculus omiophyllus.

Where silting has occurred, reedswamp communities are found right across the width of the canal dominated by reed sweet-grass Glyceria maxima or branched bur-reed Sparganium erectum. In this zone isolated clumps of water-plantain Alisma plantago-aquatica and the rarer Alisma lanceolatum, sweet flag Acorus calamus, and less frequently flowering rush Butomus umbellatus occur. Water forget-me-not Myosotis scorpioides and water mint Mentha aquatica are characteristic of this zone with water horsetail Equisetum fluviatile and the narrowleaved water-parsnip Berula erecta more local. Where the entry of side streams provides more nutrients, species such as unbranched bur-reed Sparganium emersum, great yellow-cress Rorippa amphibia, water mint and water-cress Nasturtium officinale are found.

On the upper banks and towpath margins the marsh grades into grassland. Here 190 herbaceous plant species have been recorded. This diversity is well structured and provides a continuity and variety of food niches for the important insect fauna.

Characteristic species are lady's smock Cardamine pratensis, large bitter-cress Cardamine amara, meadowsweet Filipendula ulmaria, wild angelica Angelica sylvestris, hemp agrimony Eupatorium cannabinum and gipsywort Lycopus europaeus. Skullcap Scutellaria galericulata and marsh woundwort Stachys palustris are occasional, and the lesser spearwort Ranunculus flammula is local. A rare woodland plant found on the canal banks is the small teasel Dipsacus pilosus. Thirty seven tree and shrub species are recorded within the canal boundaries. Alder Alnus glutinosa in many stretches forms a continuous fringe on the bank opposite the tow path. The boundary 'hedges' consist mainly of hazel Corylus avellana and hawthorn Crataegus monogyna with some wych-elm Ulmus glabra. Where broad margins exist between the tow path and canal boundary there are scrubby areas with hazel, elder Sambucus nigra and goat willow Salix caprea and occasionally guilder rose Viburnum opulus. For much of its length the canal has the character of a woodland ride, attracting insects from the woodland to feed on the canal flora.

A study of hoverflies Syrphidae has recorded nearly 80 species including a number of uncommon ones. Many are species whose larvae live in the reed swamp. Other groups of invertebrates have also been studied and confirm the value of this site.

The site is of local importance for grass snakes Natrix natrix and water shrews.

A preliminary assessment based on the findings of a technical report produced by Scott Wilson on behalf of Natural England has been made and the SSSI has been assessed as being in an unfavourable recovering condition. This assessment will be reviewed in line with other assessments.

Cromford Canal LNR

Last used as a working waterway in 1944, this section of the Cromford Canal is now an SSSI for its entire length from Cromford Wharf to Ambergate. Derbyshire Wildlife Trust manages the section from Whatstandwell south east to Ambergate, which is also a Local Nature Reserve.

The rich diversity of plant life along this stretch of the canal includes several species that are rare in Derbyshire, making it a vitally important wetland area. Plant life varies from pond weeds in the canal, to bankside species such as water mint and meadowsweet, to meadow and woodland plants on the towpath.

The canal attracts many insects, and in summer the bright flashes of dragonflies and damselflies darting over the water are a frequent sight.

Whatever the time of year, you are likely to spot ducks, moorhens and other waterfowl on the canal itself, as well as woodland birds such as blackbirds, robins and wrens.

This area is also one of the last remaining strongholds in Derbyshire for the water vole. This endearing creature has diminished rapidly in the county, as elsewhere in Britain, due to destruction of its habitat and predation by mink. Derbyshire Wildlife Trust is working to help ensure a brighter future for the water vole.

Another declining species that makes a regular appearance along the canal is the grass snake. They are good swimmers, but will disappear from view quickly, so it may take some time and patience to spot one.

The waterway is home to dragonflies, damselflies, ducks, moorhens and little grebes.

Water voles, which have been struggling in Derbyshire, are also found along the canal as well as grass snakes.

Both of these are priority Biodiversity Action Plan species.

Shining Cliff Wood SSSI

Shining Cliff Woods lie on east facing slopes of Millstone Grit above the River Derwent north of Belper. This ancient semi-natural oak Quercus spp. woodland is one of the few remnants of the mediaeval hunting forest of Duffield Frith, whose documented history is traceable back to 1284.

The tree cover is mostly of sessile oak Quercus petraea which in places is supplemented by pedunculate oak Q. robur. Throughout most of the wood the oak is mixed with downy birch Betula pubescens and silver birch B. pendula together with holly Ilex aquifolium, rowan Sorbus aucuparia and hazel Corylus avellana.

The acid soils derived from the Millstone Grit support a species-poor ground flora of wavy hair-grass Deschampsia flexuosa, bilberry Vaccinium myrtillus and bracken Pteridium aquilinum. In places this flora is more diverse with bluebell Hyacinthoides non-scripta, wood millet Milium effusum and honeysuckle Lonicera periclymenum. Sweet chestnut Castanea sativa, Scots pine Pinus sylvestris and European larch Larix decidua have been planted.

Within the woodland are areas of wetter ground where springs or streams occur and in these areas alder Alnus glutinosa is dominant with birch or ash Fraxinus excelsior and hazel with occasional bird cherry Prunus padus, small-leaved lime Tilia cordata and the rare large-leaved lime Tilia platyphyllos. The ground flora around these flushes is much richer, often with a thick bryophyte (moss) layer which in the wettest areas includes five species of bog moss Sphagnum spp.

Alongside the stream soft shield-fern Polystichum setiferum, beech fern Phegopteris connectilis and greater tussock-sedge Carex paniculata are found. At the upper edge of the wood, the canopy is more open and woodland gives way to small areas of grassy heath with heather Calluna vulgaris.

In moist areas close to the stream a number of molluscs of local distribution which are associated with ancient woodland occur. These are Limax cinereo niger, L. tennellus, Leiostyla anglica, Vertigo substriata, and Zenobiella subrufescens. In the drier parts of the wood, the hairy wood ant Formica lugubris is abundant. Some beetles associated with these wood ants occur, notably Clytra quadripunctata whose larvae feed on the ant nest material.

Many birds breed in the woods including pied flycatcher Ficedula hypoleuca and wood warbler Phylloscopus sibilatrix and in winter they are used by large flocks of brambling Fringilla montifringilla.

There are 6 units within the SSSI which are assessed as being in varying condition from unfavourable to favourable.

Important Nature Conservation Features

This section of the canal is of particular nature conservation importance because it supports a range of aquatic and wetland habitats which form part of a wider network of habitats including ancient and wet woodland and wet grassland.

Features of particular value along the canal include:

- Aquatic plant communities;
- Marginal swamp, fen and reed bed;
- Wet tall herb communities along the banks of the canal, particularly between the canal and towpath;
- Invertebrate communities, particularly hoverflies and water beetles;
- Water voles;
- Little grebe;
- Grass snake;
- Water shrew;
- Accessibility for public to appreciate wildlife.

The habitats within and adjacent to the canal corridor form an important wildlife corridor and are part of a wider network of habitats. Many of the habitats found in this area, such as wet meadows and fen communities are relatively small and isolated within the wider landscape and it is likely that the habitats along the canal form an important source for populations of various species of plants and invertebrates.

5.1.3. Heritage Assets

This length of canal is preserved largely in its working day condition; as such it is considerable value as a heritage asset, not least because it has not seen the incursions of modern features that are found elsewhere. There are no new bridges over the canal, the banks have not been sheet piled to prevent erosion; all in all this length of canal is closer to “original” condition than most parts of the canal system. This length of canal is in part in the Derwent Valley Mills World Heritage Site and the entire length of the canal affects the views of and the setting of this. In particular three locations on the canal are “monitoring views” of the World Heritage Site, these are

- Canal Wharf from Gothic Warehouse,
- High Peak Junction from the Canal, and
- Leawood Pumphouse

In addition, many structures along this length of canal are listed. For a full list of such structures see section 7.

In addition to this there are a number of features of interest, Gregory Tunnel is another short tunnel, this time in Water, and a number of masonry bridges survive. However, the real gems are at Cromford Wharf and High Peak Wharf. Cromford Wharf is an outstanding example of a canal basin in “working day” condition. The buildings have new uses but externally are substantially unchanged. Many terminal basins have lost original buildings or been subject to new development. Further, High Peak Wharf is of even greater significance as a canal/railway interchange basin, where the railway was originally planned as part of a through route linking two canals (the Cromford and the Peak Forest). Instances of the use of railways or tramways as part of a canal through route are uncommon and in most cases were intended to be temporary. For this reason High Peak Wharf is of international significance, a view supported by its citation in the list of monitoring views.

5.1.4. Character Appraisal

The eastern end of the Western Section is a sudden transition. Anyone who has travelled from Cromford will have enjoyed a pleasant walk in fine scenery on a canal that in many places could be navigable, and is then confronted with a large industrial use in the form of the Transco Depot that is some 1-5 metres below them, the line of the canal having quite vanished. Going the other way, the reverse is true, the industrial and urban

(but nevertheless pleasant) atmosphere of Sawmills, and the destruction of the canal, are replaced with the largest intact length on the whole line in surroundings that are largely rural and increasingly rugged.

The canal is above the outskirts of Ambergate, and for the first time is of a character that has a broad appeal to land based visitors. In recognition of this, there are signs to Ambergate Station, and frequent interpretation signs. The towpath is generally in good condition throughout, and is also a permissive cycle route. The level of use and user is indicated by the fact that there are train timetables on the towpath at Whatstandwell, where direct access to the station is available.

The route is generally wooded, and while there are fine views in winter these will be more obscured in summer, although it is apparent there is some thinning occurring.

The area around Lea Wood and High Peak Wharf has been developed as a heritage attraction, with the grouping of the Pump House, the wharf buildings and the start of the incline. There are also two swing bridges here which appear to be operable, although the one over the Lea Wood Aqueduct Channel marks the end of a short dewatered section. One of the original trip boats belonging to the Canal Society is still moored at the wharf. Whilst typical of canals elsewhere, the Cromford Canal here would never have seen such a craft visiting, and it is at the location of a monitored view.

Between here and Cromford the evidence of urban activity is present but does not impose. The premises of Pisani PLC hardly intrude in winter and will not be visible in summer. They are inaccessible, being on the offside of the canal. Finally Cromford Wharf is reached, with visitor facilities including car parking, a cafe and book store, and toilets. The Wharf buildings are as well preserved an example of an early industrial wharf complex as one could hope to find, and are an integral part of the World Heritage Site here. Cromford Station is only a few hundred yards away.

It is important that any future use of the canal has due regard to the World Heritage Site, as well as the ecological issues. While these will sometimes be at odds, in many cases they will be complementary. It is unlikely UNESCO would welcome a canal basin regularly full of modern steel narrow boats, for example, but equally the status of the site would not necessarily preclude the presence of some boats.

The canal is also very narrow in places, having been built on the side of a hill, but this doubtless lowered construction costs. In some places the route is obviously intended to be single track, in others two boats would struggle to pass. The Canal never saw motorised craft, and horse drawn craft can pass in much closer proximity than motorised vessels, as they do not suffer propeller draw pulling passing boats together. For this reason, horse drawn boats also cause less damage to the banks. The width also makes much of the canal unsuitable for casual mooring. There is potentially therefore a need to make a clear distinction between the navigational aims on this section and for the rest of the canal, not just from the point of view of the management of the SSSI, but also from a practical viewpoint.

In scenic splendour this length of canal rivals the Upper Peak Forest, The Brecon and Abergavenny Canal and the Limpley Stoke Valley section of the Kennet and Avon Canal. As such, if it is ever reconnected to the main canal network, great care must be taken that it does not become over-exploited and through sheer weight of number of boats, especially moored boats, detract from the very setting that makes it so attractive to visitors.

6. Pinxton Arm

6.1. Codnor Park to Erewash Valley Railway Bridge

6.1.1. Condition of Canal Infrastructure

The Pinxton Arm left the main line immediately above the former Top of Flight Lock 1, passing under a towpath bridge and crossing the dam of Codnor Park Reservoir.

The turnover bridge is referred to as Top Lock Bridge (1)[17], and remains, adjacent to the modern path and at a much higher level than the deepened channel of the main line. The structure is in fair condition, but with much erosion of the soft sandy stones.

Top Lock Bridge

The former channel is obvious across the dam, but beyond this point it has been infilled through to the end of this section. The line of the canal continues north east from the north end of the dam, passing under the Butterley Co. Bridge (2). This is a footbridge and is in fair condition, despite some deterioration of the brickwork on the eastern wing walls. The current headroom is approximately 1.7m which suggests that the infill is around 0.5m above the canal bed at this point[18].

[17] Note that care is required with the nomenclature: the naming of this bridge could be confusing – there were no locks on the Pinxton Arm – "Top Lock" refers to the top of the flight on the mainline canal.
[18] In this section the issue of headroom at bridges is somewhat theoretical as it depends on the amount of subsidence, the amount of over-filling and the possible future canal level.

Channel across Codnor Park Reservoir dam

Butterley Company Bridge

The next part of the line is open and runs along a road behind houses to reach a section of the canal which has been converted into a car park behind Christ Church and the Church Hall. This section of alignment is around 15m wide between boundaries.

Christ Church / Church Hall Car Park

East of the car park, Ironville Bridge (3) survives in reasonable condition. Some infill (either concrete or capped with concrete) has been placed in front of the north abutment (formerly the wet abutment). This suggests that there may have been some concern as to the stability of the abutment or its load capacity.

Ironville Bridge

The next part of the line can be traced through undulating parkland to the rear of houses on Elizabeth Park. Two manhole covers are present in the line of the canal suggesting that either a drain runs along the line of the canal or that two drains cross the canal here.

North of Elizabeth Park lies Railway Bridge (4). This carries the preserved Midland Railway Centre's line over the canal alignment. The abutments appear generally sound, as does the deck which is of composite construction (steel troughs and concrete infill). The headroom to the current ground surface is around 2.2m.

Railway Bridge

The line continues in a northerly direction, between fields, for approximately 200m to reach the site of Fletcher's Row Bridge (5). No trace of the bridge remains and the road (Nottingham Lane) crossed the former line of the canal at roughly towpath level.

Site of Fletcher's Row Bridge, towpath continues towards Pinxton at approximately the same level as roadway

Just north of the bridge site an outbuilding of the bungalow which is adjacent to the canal on Nottingham Lane is built directly adjoining the canal boundary. The canal line continues, embanked by around 2m on the east side and level with original ground on the west side. The infill undulates significantly in the section.

250m north of Nottingham Lane, a public footpath crosses the line of the canal at the location of the former Oakes Tramway Bridge (6). There are no visible remains of the bridge. Just beyond this point, the land west

of the canal is occupied by a sewage works, and that to the east (approximately 5m above the level of the canal) by businesses on Pye Bridge Industrial Estate. At the toe of the cutting face on the east side of the canal is a well maintained shallow ditch.

North of the sewage works, and just to the west of the line of the canal, lies Pye Bridge Pond. This is managed by Derbyshire Countryside Service. The pool is all that remains of a former wharf where goods were interchanged with a tramway system serving Alfreton Iron Works.

Pye Bridge Pond

A bridge, Red Bridge (7), is recorded on the FCC map in this section, but there is no evidence of this either on site or on the 1880 1:2,500 Derbyshire map.

Earthmoving work is currently underway north of the pond on the west side of the canal alignment, and the earthwork may be slightly encroaching on the line of the canal.

A few metres further north is Pye Bridge (8). This has been infilled and culverted with a pipe of approximately 300mm diameter to maintain the continuity of land drainage. It is not clear whether the bridge itself has been buried or removed, but the presence of fancy (and matching) parapets on each side of the crossing suggests that the bridge may remain in place.

Pye Bridge (infilled, but apparent from railings)

A garage structure adjoining the canal on the North West side 40m beyond the bridge is supported on a concrete slab with visible voiding beneath the foundations. From around 75m north east of the bridge, the canal is embanked on the east side by up to 4m.

200m further on the canal reaches the Erewash Valley Line, which forms a busy direct railway link between the East Midlands and South Yorkshire. The canal passes under the railway though the central span of a three arch viaduct – Railway Bridge (9). This is maintained by Network Rail and is in good condition.

Railway Bridge

About 10m beyond the viaduct a palisade fence marks the end of this section of the Pinxton Arm.

6.1.2. Ecology/environment

The canal bed is largely infilled and grassed in this section. The canal boundary is formed generally by trees and hedgerow. There is an area of recently planted woodland on the cutting face north of the canal and west of the Erewash Valley Line.

Designated Sites

There are no nationally designated sites or local nature reserves on this section of the canal. Pye Bridge Pond adjacent to the path near Pye Bridge has been restored and is a Local Wildlife Site for its aquatic interests.

Important Nature Conservation Features

The canal in this section passes through industrial and housing areas. The canal route is likely to form a wildlife corridor.

6.1.3. Heritage Assets

The only surviving feature of note is the roving bridge at the junction, which carried the towpath of the main line over the Pinxton Arm. This bridge is well preserved and of local interest, although it's setting is adversely affected by the flood wall from the reservoir flood relief channel

6.1.4. Character Appraisal

The Pinxton Arm commences from the junction with the main line at Top Lock Bridge, and initially proceeds across the dam of Codnor Park Reservoir. This length, with the reservoir and the historic bridge, could be

one of the most scenic spots to the east of Butterley Tunnel, but at present is rather tatty. The bridge itself is spoilt by the flood bank deemed necessary for the reservoir relief channel (somewhat bizarrely this flood bank is higher than the reservoir head bank it serves!) and the canal line is filled in but muddy and unkempt. However, there is little evidence of vandalism or graffiti; it is possible to imagine this being an appealing spot for visitors although as with the main line the lack of a local pub will inhibit demand to some extent.

The branch then passes through housing; again not unpleasant but the sort of area that boaters and walkers pass through on the way to somewhere. Christ Church forms a local landmark here. Gradually, Ironville is left behind and once the canal has passed under the Midland Railway the surroundings are more rural. Sadly there is no stop for trains on the Midland Railway here, as this would provide a heritage destination, although the Midland Railway Centre plans a further extension to the former Pye Bridge Station.

The canal is briefly rural until passing between a sewage works and a paper processing plant; neither is that apparent due to the tree lined nature of the canal. At the B600 the settlement of Pye Bridge is reached. There is a pub in the village called the Dog and Doublet. We were only able to ascertain that this is open during a site visit as no information could be found otherwise.

The course of the canal heads along the edge of wooded area to a bridge under the Erewash Valley Line, this length could be described as semi-rural.

6.2. Pinxton Arm – Erewash Valley Line to Pinxton

6.2.1. Condition of Canal Infrastructure

Much of the line on this length has completely disappeared in open cast workings, and while the restoration of these has restored land levels the canal has not been reinstated. Thus most of the canal is absent.

Former British Coal opencast site. The canal turned sharply to the left (north) here, following the valley seen behind the left hand two panels of the fence.

The exception to this is Pinxton Basin and Wharf, which survives as a land locked pond although the only associated building remaining is the Boat Inn. The surviving canal here is silted but largely clear of vegetation.

Remaining section of canal west of Pinxton Wharf

Pinxton Basin

6.2.2. Ecology/environment

This section of the canal can be regarded as being two distinct sections. The western section is newly restored former opencast land, and is of limited habitat value at present, although planting has been undertaken in such a way that this will improve over time.

The eastern section comprises Pinxton Basin and Wharf. This is of some ecological value, supporting a fishery and extensive areas of marginal and emergent vegetation.

6.2.3. Heritage Asset

There are no remains of the canal until Pinxton Basin is reached, although the course is unobstructed. Pinxton Basin survives and may have features of interest that are currently buried or hidden by undergrowth.

6.2.4. Character Appraisal

After the railway crossing the course of the canal is lost in the “restored” area of a former opencast colliery. The course reappears as the canal approaches Pinxton, and the basin survives and forms something of a local feature.

Pinxton has all of the usual village amenities, including a co-op, various smaller shops, two pubs and a number of take-away food shops. The Boat Inn, by the basin itself, has been refurbished and is expected to reopen soon. Although the village is dominated by engineering works, the countryside around Pinxton is very pleasant and a restored canal (or even a greenway along the route of the canal) would provide a huge boost to the village, particularly if the greenway was extended beyond Pinxton (perhaps as part of the proposed Erewash Valley Greenway (see East Derbyshire Greenway Strategy, Derbyshire County Council (1999).

7. Summary of Resource

The foregoing sections have reported on the condition of the resource from an engineering, ecological and character perspective. The first two limit the possible uses of the canal in terms of the works required and the ecological impact. The third illustrates the ability of the canal to find leisure uses.

7.1. Engineering

The engineering appraisal could be summarised by stating that restoration as far as Butterley Tunnel east portal would be relatively straightforward and in line with restoration schemes that have been promoted and implemented to date in other parts of the country. Restoration beyond Butterley Tunnel as far as the Transco depot presents many challenges, and that restoration from Ambergate to Cromford would not be problematic: engineering is not the key constraint on this latter length.

The site visits show the canal can be categorised as follows:

Sections which are either in water or where the canal remains largely intact and has not been infilled (in general structures in these sections are present and would require refurbishment rather than rebuilding or replacement):

- Langley Mill Basin
- LNER Bridge to Boat Dock Lock (Ironville)
- Codnor Park Reservoir to Butterley Tunnel East Portal
- Butterley Tunnel West Portal to Hartshay Bridge
- Short sections at Starvehimvalley Bridge and Bull Bridge (19)
- Ambergate to Cromford
- Pinxton Wharf to Pinxton Coal Basin

Sections where the canal line is evident but the canal has been infilled (generally there is little evidence of canal structures such as bridges, locks, etc. in these sections:

- Langley Mill Basin to A610 Langley Mill Bypass
- Stoney Lane Bridge to LNER Bridge
- Buckland Hollow Tunnel to Saw Mills Bridge
- Portland Basin
- Nightingale Arm
- Pinxton Arm (Codnor Park to Railway Bridge)

Sections where the ground has been remodelled extensively or land redeveloped and there is little or no trace of the former alignment:

- A610 Langley Mill Bypass to Stoney Lane Bridge;
- Hartshay Bridge to Buckland Hollow Tunnel (except short section at Starvehimvalley Bridge);
- Bullbridge Aqueduct
- Bull Bridge (19) to Limeworks Bridge (16A) in Ambergate
- Pinxton Arm (Railway Bridge to Pinxton Coal Basin

The Butterley Tunnel section where the majority of the tunnel remains intact but there is at least one collapse and there is also inadequate air draft in many places.

The Friends of the Cromford Canal have produced a map which shows the sections of canal currently in water, infilled, or lost, and this is included in this report as Appendix A.

The key engineering issues to be resolved are:

- Provision of a crossing under the A610 Langley Mills bypass;
- Replacement of Top of Flight Lock 1 at Codnor Park Reservoir whilst maintaining satisfactory routing of flood flows away from the reservoir dam;
- Refurbishment, replacement or deviation to restore navigation through or around Butterley Tunnel;
- Replacing the aqueduct at Bullbridge

7.2. Ecology/Environment

An Ecology Study of the canal between Langley Mill and Pinxton has previously been undertaken by Black & Veatch.

The ecological appraisal demonstrates that the canal forms a habitat resource and wildlife corridor, with the most valuable, and potentially most vulnerable, sites lying on the Ambergate to Cromford section. Derbyshire Wildlife Trust assists DCC in the management of the nature reserve section.

7.2.1. General Nature Conservation Features and Issues

Designated Sites

The nearest compartment of the Peak District Dales Special Area for Conservation SAC lies approximately 450 m North of Cromford Wharf. The Cromford Canal is designated as a Site of Special Scientific Interest (SSSI) and Local Nature Reserve (LNR) between Cromford Wharf and Ambergate. The Butterley Tunnel passes adjacent to Hammersmith Meadows LNR. The route of the canal also passes through a number of non-statutory designated Local Wildlife Sites (LWSs). Statutory designated sites identified are summarised in Table 1. These are discussed in further detail, along with LWSs, under the specific sections above.

Table 1. Statutory Designated Sites within 1 km of the Canal Route

Site Name	Designation	Distance from Canal	Report section
Peak District Dales	SAC	450m at Cromford Wharf	5.1.2
Cromford Canal	SSSI	0m	5.1.2
Shining Cliff Wood	SSSI	125m at Chase Bridge	5.1.2
Ambergate and Ridgeway Quarries	SSSI	450m at Bullbridge	4.4.2
Matlock Woods	SSSI	450m at Cromford Wharf	5.1.2
Masson Hill	SSSI	670m at Cromford Wharf	n/a
Via Gellia Woodlands	SSSI	680m at Cromford Wharf	n/a
Rose End Meadows	SSSI	820m at Cromford Wharf	n/a
Cromford Canal	LNR	0m	5.1.2
Hammersmith Meadows	LNR	20m at Butterley Reservoir	4.1.2
Carr Wood	LNR	300m at Butterley Reservoir	4.1.2
Matlock Parks	LNR	750m at Cromford Wharf	n/a

Reasons for these designations and the condition of each designated site are given in the relevant ecology / environment sections of the resource statement: these sections are referenced in the summary table above. Although all designated sites within 1km of the canal are listed here, only those within 500m are discussed in detail in the text.

Notable Habitats

For most of its length, the Cromford Canal forms a habitat corridor which is likely to be important for enabling the movement of species within the area. In many parts there is public access along the route, which generally increases the amenity value of the ecological features. Much of the canal is watered, which provides aquatic habitat, while infilled sections support a range of habitats. UK BAP priority habitats identified along the route include:

- Lowland Mixed Deciduous Woodland
- Wet Woodland
- Lowland Meadow, including marshy grasslands and dry grassland.
- Rivers
- Reed beds
- Eutrophic standing waters
- Ponds
- Hedgerows

Notable Species

Some parts of the canal are known to support water voles and white clawed crayfish. Great crested newts are also known to be present in the vicinity and could occur within the canal and in neighbouring water bodies and using terrestrial habitats within up to 500 m of water bodies where they are present. Bats are likely to be present, possibly roosting in structures such as bridges and tunnels and in trees and buildings in the vicinity and using the route of the canal for roosting and foraging. Other protected species with potential to occur include badger, otter and reptiles, particularly grass snake. Much of the canal route is likely to be of value to a range of breeding birds, while the eastern section is also of particular value for migrant birds.

Any works within the canal corridor would require further assessment and possibly detailed surveys for these species and designs would have to have to take their conservation and protection into account, including all legal and statutory protections and the provisions of local and national planning policy. It must be demonstrated that either the works are not detrimental to protected species or habitats or that appropriate mitigation will be implemented. Given that this is a canal, there are likely to be many opportunities for enhancement.

A number of invasive species are known to be present on the Cromford Canal. Increased connectivity of the various sections of canal, introducing new water supplies and moving boats (both within the Cromford Canal system and from other waterways) all present potential risks of encouraging the spread of invasive plant and animal species. In addition undertaking construction works within the vicinity of invasive species can cause their spread. A survey to identify invasive plant and invasive animal species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) should be undertaken as part of the development of the selected option for the canals.

Further Assessment

If proposals involve changes to the management or use of the canal, an assessment of the impact of the proposals and effective mitigation (and potentially enhancement) will be required.

7.3. Heritage Appraisal

Sections of the canal that are intact have been identified above. From a heritage perspective the canal has a number of listed structures and also enters the world heritage site, having three monitoring views scheduled as part of this designation.

In addition, as the canal has been considered in sections, the overall heritage of the engineering concept has not been mentioned. Cromford wharf is approximately 85 metres above sea level, or around 25m higher than the Erewash Canal at Langley Mill. The level to Cromford Wharf is carried all the way from Pinxton, a distance of 14.5 miles (23 kilometres) right into the Peak District; whilst not unique (the Brecon and

Abergavenny Canal has a 35 mile long pound in the Brecon Beacons) it is still a notable achievement in the late 18th Century.

Listed Buildings on or near the Canal

LBS No.	Building name	Grade	Grid ref	Date listed
79083	Lock 7	II	SK 443 506	25.5.88
492796	Lock 6	II	SK 442 515	06/01/2004
79082	Lock 5	II	SK 440 517	25.5.88
79081	Ironville Canal Bridge (37) (Jack Brown's)	II	SK 438 517	6.12.74
	Ironville House	II	SK 436 517	5.1.06
79084	Junction Bridge (35A) (1)	II	SK 435 515	25.5.88
Various	*Golden Valley Cottages*	II	SK 426 512	25.5.88
79098	*50 Golden Valley Rd (Stone Row)*	II*	SK 426 512	25.5.88
79099	*Newlands Inn*	II	SK 422 512	25.5.88
79110	*Headstocks, Brittain Colliery*	II	SK 415 517	25.5.88
79107	*Butterley octagonal post house*	II	SK 399 508	25.5.88
	Butterley offices	II	SK 401 507	25.5.88
79133	Starvehimvalley Bridge (29)	II	SK 375 513	25.5.88
79112	Buckland Hollow Tunnel and embankment	II	SK 373 518	25.5.88
79123	Cromford Canal embankment	II	SK 359 523	25.5.88
79147	*Buckland Hollow farmhouse*	II	SK 375 517	29.11.65
79146	*Bridge over Amber*	II	SK 362 518	25.5.88
79106	Canal Bridge, Bullbridge (19)	II	SK 357 523	25.8.88
79104	*Canal Inn*	II	SK 357 524	25.5.88
79105	*Cottages 26 and 28 Bullbridge Hill*	II	SK 357 523	25.5.88
79111	Canal Bridge (16) (Poyser's) (Hugh's)	II	SK 346 519	25.8.88
79135	Canal Bridge (east of Canal Cottages)(Gratton's) (15)	II	SK 345 520	25.5.88
78649	Canal Cottages	II	SK 344 520	14.8.85
78679	Canal Bridge Whatstandwell (13)	II	SK 332 543	14.8.85
78689	*Whatstandwell Bridge*	II	SK 332 543	13.2.67
78980	*Derwent Hotel*	II	SK 331 543	13.2.67
78725	Lengthman's Cottage (Leawood Junction)	II	SK 316 556	14.8.85
429290	Leawood Pump House	II*	SK 315 556	26.10.72
429364	Agent's House	II	SK 313 559	26.10.72
477031	NE Boundary Walls, Cromford Wharf	II	SK 300 569	31.8.99
449881	Southern (1824) Warehouse	II	SK 299 570	8.5.92
449883	Counting House	II	SK 299 570	8.5.92
449884	Northern (Gothic) Warehouse	II	SK 299 570	8.5.92
449886	Side walls and curbs to canal	II	SK 299 570	8.5.92
449887	Northern retaining wall with loading bays	II	SK 300 570	8.5.92
449889	Wharf Cottage	II	SK 300 570	8.5.92
	Lea Wood Cottages (various)			
	Note – nothing listed on Pinxton Arm except the Junction Bridge, or south of lock 7			

Scheduled Ancient Monuments

	High Peak Aqueduct		SK 320 556	
	Wigwell Aqueduct		SK 316 556	
	Leawood Pumphouse		SK 315 556	

Sites identified in the World Heritage Designation

- Canal wharf from Gothic Warehouse
- High Peak Junction from the canal

- Leawood Pumphouse

In addition to these scheduled and listed structures other structures survive, although in some cases significantly degraded and/or inaccessible. The most notable of these in our opinion are the former house and workshop at locks 5/6, remains of Portland Basin, the “Wide Hole” in Butterley Tunnel and the Great Northern Basin.

7.4. Physical Access

A brief survey of physical access arrangements and public transport / parking provision, particularly relating to the main nodes at Langley Mill, Ironville / Codnor Park, Butterley, Ambergate and Cromford has been undertaken.

7.4.1. Road Access

The canal lies relatively close to the A38 and M1. The A610 road links Nottingham and Ambergate, bypassing Langley Mill, Codnor and Ripley. This road lies mostly within the study corridor, running parallel to the canal. The same is true of the A6 between Ambergate and Cromford. There are many individual access points, although these are generally on minor roads and few are well provided with parking. The exceptions are car parks close to the canal at:

- Codnor Park Reservoir (2 car parks, one by the outlet weir and one by the inlet);
- The Midland Railway Centre (above Butterley Tunnel);
- Butterley Reservoir;
- The Excavator Public House;
- Whatstandwell Railway Station;
- Cromford Wharf.

7.4.2. Public Transport

Rail

The canal corridor is served by railway stations at Langley Mill, Ambergate, Whatstandwell and Cromford.

Northern Rail runs an hourly service between Nottingham and Leeds that stops at Langley Mill. East Midlands Trains operate a few services per day from Langley Mill southbound to Nottingham and beyond (usually Norwich) and northbound to Sheffield (usually continuing to Liverpool Lime Street). Some East Midlands Trains services from London St Pancras to Sheffield / Leeds also call at Langley Mill. The station is approximately quarter of a mile from Great Northern Basin.

Trains to Ambergate, Whatstandwell and Cromford generally originate at Derby and are operated by East Midlands Trains. The journey time from Derby is approximately 26 minutes, and trains run hourly through most of the day. Ambergate Station is around quarter of a mile from the canal at Chase Road Bridge. Whatstandwell Station is immediately adjacent to the canal. Cromford Station is around quarter of a mile from Cromford Wharf.

One way walks are possible from Derby and points further afield along the Cromford to Ambergate section of the canal. With careful train choice and a good knowledge of the route of the canal and neighbouring footpaths, it is also possible to undertake a one way walk from Langley Mill to Ambergate or vice versa.

The Midland Railway Centre lies above Butterley Tunnel. This serves more as a visitor attraction than a means of transportation, although there is potential for the train service within the site (both standard and narrow gauge lines) to be more integrated with the canal towpaths etc., providing options for one way walks.

Bus

The bus network in the vicinity of the canal is shown below:

Two busses an hour link Langley Mill and Ripley via Codnor, giving access to the eastern section of the canal (routes 1 and 1A). Ripley and Cromford are linked by bus services 144 (which runs along the canal corridor) and 141/2 (which runs via Heage and Crich).

7.4.3. Access Points

Details of individual access points are included in the text relating to the Condition of Canal Infrastructure for each section.

7.5. Intellectual Access

A survey of the partners was undertaken in November 2011 to establish the extent of printed information they provide, and this was used together with observations on site and a review of information available on the internet to establish the extent of intellectual access available at present.

7.5.1. Survey of Intellectual Access Provided by Partners

The partners were surveyed to establish what information they provide. The primary focus of this was on print format material (e.g. leaflets and guidebooks etc.).

One of the main respondents to the survey was Derbyshire County Council Cultural and Community Services, which is responsible for the promotion of the Derwent Valley Mills World Heritage Site. Their response was as follows:

> *In terms of the World Heritage Site material, we have produced:*
> - *An interpretation panel at Cromford Wharf explaining its history*
> - *A Cromford Mill Walk booklet featuring the wharf area*
> - *A now out-of-print 'Ambergate' walk leaflet encouraging use of the canal towpath for walks through the WHS, returning by bus or train.*
> - *A book 'The Derwent Valley Mills and Their Communities' which includes details of all the historic buildings along the canal within the DVMWHS.*
> - *Much of the information from that book is also available on the www.derwentvalleymills.org website, in the history section.*
> - *A souvenir guidebook for the WHS, called 'The Derwent Valley Mills' features two pages on the canal.*
> - *A free visitor guide leaflet is printed each year for the WHS, including information on the canal.*

The Chairman of the Friends of Cromford Canal group responded as follows:

- *In addition to our website, we maintain three/four notice boards. One of these is at Cromford Wharf, one at High Peak Junction, one at Codnor Park reservoir and one shortly to be installed at Pinxton Wharf.*
- *The FCC publishes a membership leaflet with map etc which is widely available.*
- *The FCC also publishes a 'Walkers Guide to the Cromford Canal' which is chargeable and thousands of copies have been sold since 2002.*
- *The FCC has two interpretation boards in place. One at Sawmills interpreting the remains of a gauging narrows and one at Bullbridge interpreting the former site of the Bullbridge aqueduct.*
- *The society gives talks, hosts social events with a talk through autumn, winter and spring and attends events on a local, regional and national basis spreading our message regarding the need to restore the canal to navigation.*
- *The FCC members' magazine 'The Portal' is also sent to local politicians, libraries, other organisations and of course to members. Archive editions of the Portal three months behind are also available from our website.*

Derbyshire Dales District Council responded as follows:

> *"The only information we provide directly on the canal is that included as part of the Cromford Conservation Area Appraisal, this is available on the District Council's website. The District Council also contributes to the work undertaken by the Derwent Valley Mills World Heritage Site, which provides visitor guides, leaflets and discovery days promoting Cromford and the canal as an integral part of the World Heritage Site."*

7.5.2. Information Provided on Site

The provision of intellectual access along the canal itself is limited to interpretation boards and some signage indicating ownership of various sections of the canal. Examples of these are shown below.

Erewash Valley Trail sign at Langley Mill

Severn Trent Water sign describing Erewash Valley Green Corridor

Derbyshire Wildlife Trust sign at Stoney Lane Bridge

Sign at start of Pinxton Canal Path in Codnor Park

The Friends of the Cromford Canal maintain a sign at the main Codnor Park Reservoir car park which gives details of the history and layout of the canal. There are lock name signs at many of the Codnor flight locks.

7.5.3. Information Available from the Internet

On the internet, the main search responses identified via Google are:

Friends of the Cromford Canal Website

This website, at http://www.cromfordcanal.info, gives details of the Friends' activities, including work parties, talk etc., with links to further information about the history of the canal, the canal today, news about the canal and its restoration, and further details of the Friends.

Wikipedia

An article giving a history of the canal and an overview of the current situation has been created for Wikipedia and is available at http://en.wikipedia.org/wiki/Cromford_Canal.

BBC Website

The BBC website hosts a three minute video of a programme forming part of a series of canal walks in which John Holmes gives an overview of the heritage and ecology of the canal, and the obstacles to restoration at Ambergate and Butterley Tunnel. The video concludes with a reference to leaflets available from the Friends of Cromford Canal.

Waterscape

The Waterscape website (British Waterways leisure website) gives a very brief outline of the Cromford Canal, with links to an interactive map, some sketchy information about boating and fishing, a description of a walk from Cromford Wharf to Lea Wood Aqueduct, basic details about the Derbyshire Wildlife Trust and Golden Valley Country Park, and contact details for the local British Waterways office at Newark.

Derwent Valley Mills World Heritage Site

The World Heritage Site website gives details of buildings and structures of heritage value, including many listed structures, along the canal and within the Site at:

http://www.derwentvalleymills.org/history/key-sites/65-the-cromford-canal.

Other Online Information

Information is also provided online which describes sections of the canal from other points of view. For example the Wildlife Trusts provide information about many of the wildlife sites which for part of the canal corridor:

Nottinghamshire Wildlife Trust

This website, at www.nottinghamshirewildlife.org, gives details of the Erewash Meadows Nature Reserve, including a map. The website states that their double-sided A3 foldout leaflet is available covering all three sections of the reserve is available on request.

Nottinghamshire Birdwatchers Website

An article on the Erewash Meadows Nature Reserve is also available at:

www.nottsbirders.net/erewashmeadows.php

7.5.4. Conclusion

Intellectual access is available, but is not consistently presented or branded. There is no “lead” provider, and generally there are small amounts of information available from many sources. There is no overall “brand” or consistency within the work undertaken by the various organisations and agencies in this area, and this probably reduces the overall level and ease of access to information about the canal and its corridor.

7.6. Character Appraisal

The Character Appraisal indicates that the canal from Langley Mill to Butterley Tunnel East Portal is of a character that is readily found on the canal system, and expresses slight concern over the number of locks from the Trent should this be the ultimate terminus. The area around Codnor Park Reservoir is identified as being particularly attractive. The jewel in the crown however, is the length from Ambergate to Cromford, both from a heritage, environment and scenic perspective.

It is noted that the following navigation structures survive since the canals closure, and can be regarded as part of the canal’s built heritage, in that they serve to interpret the canal’s historic presence and it’s past.

Main Line

- Derby Road Bridge (in use)
- Lock 14 Langley Bridge (in use)[19]
- Portland Basin Bridge (filled in, over entrance to basin)
- Locks 2-7 Ironville Locks
- Erewash Valley Railway Bridge, Codnor Park
- Ironville Bridge
- Pinxton Arm Bridge No. 1
- Butterley Company Bridge
- Golden Valley Bridge

[19] Bradshaw (1904) refers to both Langley Mill Lock and Nottingham Road Bridge as Langley Bridge

- Butterley Tunnel
- Ripley Road
- Hartshay (filled in)
- Starvehimvalley Bridge
- Excavator Railway Bridge (line now closed)
- Buckland Hollow Tunnel
- Brickyard Bridge
- Amber Culvert, Sawmills
- Drovers Way under bridge, Sawmills
- Bullbridge Bridge
- Hag Tunnel (filled in and inaccessible)
- Pipe
- Accommodation Bridge, Ambergate
- Chase Road Bridge
- Crich Chase Bridge[20]
- Crich Council Footbridge
- Whatstandwell Bridge
- Sims Bridge
- Lea Shaw Bridge
- Gregory Tunnel
- High Peak Aqueduct
- Lea Wood Aqueduct
- Swing Bridge, Lea Wood
- Swing Bridge, High Peak Wharf
- Accommodation Bridge, Cromford

Pinxton Arm

- Top Lock Bridge
- Footbridge, Ironville
- Bullock Lane Bridge[21] (rebuilt on original site)
- Midland Railway Bridge
- Fletchers Row Bridge
- Pye Bridge (filled in)
- Erewash Valley Railway Bridge

In addition there are several well preserved canal related buildings at Lea Wood, High Peak Junction and Cromford Wharf, and a number of other buildings along the length of the canal. There will also be less visible structures such as culverts under the canal for streams. .

7.7. Overall Summary

A partial restoration to Butterley Tunnel from Langley Mill could be relatively straightforward, but might not present anything to the cruising market that is not already available elsewhere and thus may attract relatively low levels of additional use over and above the number of vessels currently cruising the Erewash Canal.

However, one of the biggest pressures facing the national system is a lack of moorings and increased demand at popular locations, and increased water space does have the effect of acting as a safety valve for growth.

[20] Named after the adjacent woods
[21] Named after the road passing over the bridge – not the original structure

Restoration to Cromford would present a very attractive addition to the national inland waterways offer, but is also complicated in engineering terms and could be potentially damaging in environmental terms.

Stage 2, the Options Appraisal, will seek to identify a resolution to this fundamental conflict, by appraising the various options to help to identify a way forward for the Partnership.

Part Two:

Options Appraisal

8. Identification of Options

The options appraisal is intended to identify the range of future treatments available for sections of canal and inform decisions as to what actions should be taken in the short and long term. It should be noted that the options appraisal itself does not make recommendations in this regard; it is simply intended to inform such decisions. The brief calls for four options to be considered, these are

- Do Minimum
- Creation of a linear water park and destination nature reserve
- Partial restoration
- Full restoration

8.1. Do Minimum

This entails maintain the canal in its current condition, or dealing with the canal in a manner that is cost effective and in the interests of public safety. In effect this is how the BW owned length at Ironville is managed now. Management of the Cromford to Ambergate section goes some way beyond this due to its status as a SSSI and its role in the World Heritage Site.

8.2. Creation of a Linear Water Park and Destination Nature Reserve

This option involves developing the canal corridor as a linear water park and destination nature reserve (a site or series of linked sites with high significance for biodiversity, heritage and recreation) with increased public access via footpaths and cycle ways (increased interpretation of archaeological and natural heritage etc). This provides the opportunity to:

i. create new sites with high significance for biodiversity, heritage and recreation,

ii. enhance the biodiversity, heritage and recreation significance of existing sites, and

iii. include other existing attractions within the linear water park and destination nature reserve.

8.3. Partial Restoration to Navigation

This option entails restoring navigation to the Cromford Canal between Langley Mill and the East Portal of Butterley Tunnel, and to the entire Pinxton Arm.

There are a range of sub-options to be considered as to how far to go in addressing the remainder of the canal, and, indeed, in treating the restored section:

- Partial restoration + do minimum on remaining section of canal;
- Partial restoration + creation of linear water park and destination nature reserve on remaining section of canal;
- Incorporation of partial restoration into the linear water park and destination nature reserve for the whole of the canal.

8.4. Full Restoration to Navigation

This option would entail creating a navigable waterway, reusing the historic canal as far as practical, and is considered for all sections, it should be noted that full restoration of individual sections without restoring the whole canal is a practical option in itself. Section 11 identifies the works required to achieve this.

The following report sections look at each option for each section of canal.

9. Do Minimum Option

The "Do Minimum" scenario involves continuing to maintain the individual sections as they are at present with separate sections in water, nature reserves and heritage features. At the consultation workshop a clear feeling was expressed that this was not adequate in the Codnor Park / Ironville area. It was felt that maintaining the status quo in this area could lead to further dereliction, damage and potential crime, and that this in turn might lead to calls for the course of the canal to be infilled. For this reason a "Do Minimum Plus" option is also considered which would address these local issues.

9.1. Engineering and Environmental Issues

9.1.1. Langley Mill

This length if already navigable, in a do minimum scenario the canal needs no attention beyond that already given by ECP&DA.

9.1.2. Langley Mill (A 610) to end of infill

Engineering considerations

To all intents and purposes this length of canal does not currently exist, and thus in a Do Minimum Scenario no action is needed

9.1.3. End of Infill to Butterley Tunnel

Engineering considerations

This length of canal is in water. The section owned by BW is not listed as Cruiseway or Commercial and so, under the terms of the 1968 Transport Act, BW's minimum commitment is to manage the canal cost effectively in the interest of public safety. Public utility and amenity are not part of their remit. To this extent, "Do Minimum" is to carry on with the present scenario.

However, this is not a fair reflection of the importance of the route of the canal to Ironville and Codnor Park. These combined settlements would literally be better off with no canal at all than with the canal in its present condition in the vicinity of Ironville Locks, and thus our recommendation, on the basis that total destruction of the canal hereabouts is anathema and possibly impractical for reasons of drainage and flood relief, is that a "Do Minimum Plus" option could be pursued. This would involve some upgrading and increased maintenance such that the canal could be the equivalent of a public park. This would entail:

- Dredging of the canal and removal of detritus;
- Restoration of structures to a level above that of "dereliction", i.e. consolidating the existing remains and making them safe[22];
- Upgrade of towpath and surrounds.

We do not recommend making such a park in any way ornamental. This will avoid increasing the future maintenance liability, and also enable the heritage asset to be conserved with minimum intervention, so it could be fully incorporated in any future restoration proposals.

[22] Including, for locks, the replacement of the forebays as required to ensure structural stability and the refurbishment of the weirs/stop logs to retain an appropriate level of water in each pound

It should be noted that this length of the canal is the focus of work parties from the Friends of the Cromford Canal. There is a question mark as to whether the volunteers on such work parties would be willing to turn out if “managed neglect” were to become the official policy for the foreseeable future.

Environmental considerations
There is no statutory requirement for any attention to this length of canal in a do minimum scenario, but given the above, consideration of environmental benefits that will enhance the standing of the area as a whole should be considered.

At present this section of the canal can be characterised as being heavily silted and is effectively a wetland habitat, with widespread marginal / emergent vegetation and associated fauna. The existing habitat and species present should be surveyed and appropriate mitigation and enhancement designed and included in the scheme to ensure that there is no loss and any potential ecological benefits are included in the scheme.

9.1.4. Butterley Tunnel

Engineering considerations
The Do Minimum Scenario for Butterley Tunnel is in effect to do nothing beyond that which is already done to guard against collapse and subsidence.

9.1.5. Remainder of Central Section

Unlike the other sections of this report, we have grouped all parts of the central section other than Butterley Tunnel under one heading.

This length of canal is largely but not totally destroyed. Significant remains exist at Buckland Hollow and Sawmills, along with evidence of the track at Lower Hartshay.

Some lengths of this section are public rights of way, and thus carry a statutory obligation regarding safety. This includes Buckland Hollow Tunnel, which has a right of way through it. As a whole, public rights of way must be respected legally, but in the case of Buckland Hollow Tunnel, the right of way not only passes through an important heritage feature but avoids a crossing of a significant road in doing so.

The embankment at Sawmills, along with the structures carrying the River Amber and the lane underneath, should be preserved even in a do minimum scenario as relics of the canal. Along with the base of the piers over the railway, and the surviving length of canal beyond the housing development in Sawmills these features allow interpretation of the canal through this area. A repeat of the planning permission which allowed houses to be built on the line of the embankment should be avoided.

Elsewhere sections of canal bed survive; these should be preserved as interpretative features in any do minimum scenario and may be adapted for habitat creation, although they would not form part of a corridor without further enhancement.

9.1.6. Western Section

This section of canal is the best preserved and also subject to a number of statutory designations. The canal is a SSSI, and at various points is either within a world heritage site or affects the setting of a world heritage site. In short, even do minimum is onerous. The SSSI is in “unfavourable recovering” condition, recovering because of the recent dredging works, but is still a long way from being in favourable condition. This will require significant investment in years to come to facilitate additional dredging, tree removal, and raising of water levels.

It could be argued that the current management is struggling with “do minimum” management along this length of canal. A short length is dry, and much of it silted to the point where the environmental asset is gradually being degraded. It has been commented that the canal is difficult to maintain and, at present,

provides limited revenue (we assume that rental on the buildings at Cromford Wharf does little beyond maintain those buildings).

Options for this length are explored more fully in the "intermediate restoration" section but it is clear that even to retain this length of canal in its current condition intervention, with revenue funding attached, is required

9.1.7. Pinxton Arm

The Pinxton Arm only exists as a corridor. The canal has been abandoned and infilled. The structures remain and the track is given over to nature with a footpath running along the line of the former canal.

At present the Pinxton Arm does not need any significant attention under a do minimum arrangement but does not really add greatly to the area it passes through, other than forming a wildlife corridor and, in the Ironville section, a useful off-road pedestrian linkage.

Pinxton Wharf is an exception. The Wharf is actively managed by Derbyshire County Council as a water feature and does have angling pegs. This is an asset to the area. Implementation of a do nothing option here would ultimately entail closing the site to the public and neglecting the asset. We have therefore taken the view that do minimum here actually should mean maintaining the status quo.

9.2. Costs

No costs are provided for the "Do Minimum" option as this does not reflect any increase in current expenditure. In addition the costs are currently met by a range of organisations and, as such giving a single cost for the "canal" could be misleading.

The "Do Minimum Plus" option requires an element of capital expenditure on the section of the canal between Portland Basin Bridge and the former junction of the Pinxton Arm. This is shown in the table below.

Table 2. Capital Costs for Do Minimum Plus

Task	Quantity	Rate	Cost
Consolidate structures to preserve heritage asset and make safe: Portland Basin Bridge Butterley Co. Wharf Lock 2 Bridge Retaining Walls (2)	4 no.	£10,000	£40,000
Restore forebays and improve weirage arrangements at locks to improve water retention through Ironville	7 no.	£5,000	£35,000
Vegetation clearance and planting etc.	5,000m²	£3	£15,000
1.5m wide stone towpath surface	1,000 lin. m	£30	£30,000
Signage and interpretation	15 no.	£500	£7,500
Initial Project Promotion	SUM	£2,500	£2,500
Professional fees and project management	Approx. 15%[23]	£95,000	£15,000
TOTAL			**£145,000**

[23] A lower figure of 12.5% including survey is used elsewhere in the report, but 15% is considered appropriate for this much more limited scheme.

There will also be additional maintenance / operation costs as detailed below:

Table 3. Additional Annual Operation/ Maintenance Costs for Do Minimum Plus

Task	Quantity	Rate	Cost
General maintenance of structures, fencing, signage etc.	2 days	£1,000	£2,000
Graffiti removal	2 visits	£500	£1,000
Ongoing Promotion	1 promotion / year	£1,000	£1,000
TOTAL			**£4,000**

Costs of mowing, strimming and hedge maintenance have been omitted as this work already appears to be being undertaken on this section and is thus not attributable to the upgrade.

Three organisations are already incurring costs related to the canal in the existing situation. These are Derbyshire County Council, British Waterways and Derbyshire Wildlife Trust. Breakdowns of the expenditure of each organisation have been provided and are given below.

Derbyshire County Council: Ambergate to Cromford

Team costs:	
2.1 Full time wardens	£47,250
½ FTE Ranger	£15,500
½ FTE Manager	£18,000
Vehicle / plant / equipment	£8,000
Materials	£5,500
Total	£94,250
Annual tree maintenance programme:	
Hire of tree contractors	£6,000
Regular engineering works (Leaks etc):	
Per annum	£60,000
Total for annual work	***£160,250***

In addition, Derbyshire makes use of volunteers to add a further workforce, and also has capital requirements for the canal. These are given below:

Large scale repairs / dredging schemes:	
Railway Aqueduct	£450,000
Dredging Ambergate	£200,000
Dredging Leashaw	£200,000
Dredging Cromford – High Peak Junction	£250,000
Total	£1,100,000

It should be noted that these estimates do not include design and supervision. The railway aqueduct cost is a one-off, but dredging costs may recur, perhaps at ten to twenty year intervals.

British Waterways

British Waterways has provided a summary of its responsibilities and its ownership. It owns around 3km of canal including a number of structures isolated from other property in their ownership. The two reservoirs that are in its ownership are leased to angling societies. BW estimates that its management of the canal, which is largely restricted to keeping the structures safe with some grass cutting and litter picking costs around £35,000 per annum

Derbyshire Wildlife Trust

Derbyshire Wildlife Trust has identified 27 volunteer days per annum on the Cromford SSSI and 22 on the Erewash meadows site. In addition it has identified £1,500 of staff time.

The Friends of Cromford Cana

FoCC also contributes significant volunteer time to the upkeep of the canals. The amount of time is unknown but if this could be reliably estimated it should be added to the annual costs estimate for the do minimum option.

Status Quo Costs Summary

In summary, the status quo is costing of the order of £200,000 per annum and has a capital requirement of £1.1 million.

9.3. Benefits

The true do minimum scenario offers no benefits over and above that which are already derived from the canal. Indeed it is precisely for this reason that we have recommended a “Do Minimum Plus” scenario that actually goes somewhat further in Ironville and on the Cromford – Ambergate section. Do minimum in the long run would actually harm the heritage asset as the approach taken would, in effect, deem that any structure or length of canal that did not enjoy statutory protection would be destroyed when its condition deteriorates so as to become unsafe.

For the “Do Minimum Plus” options a revenue stream could result from the provision of a horse drawn trip boat at Cromford. The previous operation attracted 15,000 passengers a year and there is no reason why this could not be achieved today. This would provide revenue to the operator of the order of £60,000 per annum, which would exceed the running costs of the boat and provide a revenue source towards the canal. In addition, both the passengers on the boat and other towpath walkers attracted by the activity on the water would spend money elsewhere in the area as part of a day out or longer visit. This effect has not been quantified. Finally there is the non-fiscal benefit of a horse drawn boat providing a better interpretation of the canal’s historic use than the current situation with no navigational use or interpretation of the canal.

10. Creation of a linear water park and destination nature reserve

The creation of a linear water park (LWP) and destination nature reserve was one of four options in the brief.

10.1. The "Linear Water Park"

We have taken the LWP to mean development of a "park" which would include the entirety of the canal corridor, including its wildlife, heritage and other attractions and resources. The unifying feature would be the water spaces within the park, which would include the Rivers Erewash, Amber and Derwent as well as the Cromford Canal, Pinxton Arm and the canal reservoirs.

Assuming such a park followed the line of the canal as far as possible then at present less than half of the length would include canal currently in water and the park would, of course, need to include the hill which the Butterley Tunnel passes under. There are some opportunities to increase the amount of water space but it should be borne in mind that where the canal has been infilled or destroyed this may be less than straightforward, and could get nearly as costly as a full restoration.

10.2. The "Destination Nature Reserve"

The brief also calls for a "destination nature reserve". Destination is generally a term used in tourism to denote an attraction sufficiently great it sets the market. A good example would be Slimbridge Wildfowl and Wetlands Centre in Gloucestershire.

In this case the offer of the nature reserve (or rather the network of designated sites which are linked by the canal corridor) would be somewhat smaller but could form a key part of the package of attractions throughout the area offered by the canal. The destination nature reserve can be seen as the mosaic of individual sites, connected together physically by the linear water park and intellectually by a single unified branding and a consistent approach to management.

The Cromford canal is already "a destination", with thousands of people coming to cycle and walk it every year. Building upon this audience base and linking into the wildlife and heritage sites would be a logical progression. In addition a large linear nature reserve running through the heart of Derbyshire would be an unprecedented initiative, and would be a draw in its own right.

10.3. Cohesion and Consistency

The key issue to be addressed in providing the LWP and integrating the various statutory and locally designated wildlife sites to provide a destination nature reserve is providing a single, cohesive "offer".

To do this the various wildlife sites and elements of the LWP must be linked physically and in terms of marketing.

10.3.1. Physical Linkages (the "Cromford Canal Trail")

The destination nature reserve should provide a mosaic of linked habitats across a large area, accessible by people through a shared use trail. This could be achieved physically by upgrading the towpath and (in the Butterley Tunnel section) the former Horse Path to provide a "Y" shaped continuous mixed used path ("a Cromford Canal Trail") linking Langley Mill, Pinxton and Cromford with Codnor Park at the node. This would not only provide a much improved physical link between the various sites and points of interest, but would

also be a means of attracting people to the canal corridor as it will provide a useful non-powered transport link with the Erewash Valley Trail (Nottingham, Long Eaton and Beeston), Ripley Greenway (Derby via Little Eaton), Ashfield District Cycleways (via Pinxton towards Sutton-in-Ashfield and Mansfield), and the High Peak Trail (Buxton, Ashbourne). The route would also feed into the northern section of the Derwent Valley Mills World Heritage Site.

Elsewhere, creating such route has also been a means to promote full restoration (for example the Wey South Path following the Wey and Arun Canal). In the case of the Cotswold Canal a section of the route is being developed as a multi-user trail to enable land to be assembled for the later creation of a canal bed: although the path will be 3m wide the Heritage Lottery Fund are funding both the creation of the path and the purchase of a 30m wide corridor. Where land agreements are required to implement the shared use path these could include provision for any land which would be required should the full restoration of the canal be undertaken at a later date.

Bringing together the various designated sites as part of the destination nature reserve, linked by the LWP shared use path, would have clear benefits for wildlife. Some areas where there are opportunities to create, restore and manage Biodiversity Action Plan habitat are highlighted below, and by linking the various LWS site together and managing them more proactively the condition of some of the sites could be improved. If this option is taken forward, emphasis should be put on identifying and quantifying these outputs more clearly.

10.3.2. Intellectual Linkages (Consistent Branding)

In a more cerebral way, the LWP could be made to feel like a cohesive whole by applying consistent branding to all of the constituent parts of the park. This requires a shift in approach as each of the various management agencies responsible for elements of the LWP must accept that their organisation's branding becomes subordinate to the overall LWP brand. If this could be achieved then considerable cross-marketing benefits will be realised, particularly with relatively local day trip visitors who will discover additional attractions either through the cohesive branding or via the physical linkages offered by the mixed use path and signage.

10.4. Characteristics and Opportunities in the LWP

In the following table and discussion we have attempted to identify the relevant characteristics of each canal section and the main opportunities offered by each section to contribute to the Linear Park. Working up detailed proposals is difficult and whilst there are some suggestions in the following text, no attempt can be made at this stage to synthesise these into a full proposal without much further work. Quantitative analysis of costs and benefits for this option at this stage would therefore be premature. However a set of suggestions for further study and development of this option is presented in the opportunities column of the table.

Table 4. Characteristics, opportunities and linkages within canal corridor

Section	Key Characteristics	Opportunities
Links in to Langley Mill	Erewash Valley Trail with connecting routes towards Derby and Nottingham	Provide better signage and improve connectivity.
Langley Mill / Great Northern Basin	Local facilities Underdeveloped basin with some structures of real heritage value Limited access	Improve signage to and connectivity with Ironville and Codnor Park. Provide information about LWP in local outlets. Opening up towpath / route through basins, improved access, boat based visits, new development at Smotherfly
A610 to end of infill	No (easy) physical connection	Use river corridor or establish link

Section	Key Characteristics	Opportunities
	between GN Basin and Stoney Lane Bridge	on proposed route of canal to provide linkage from Smotherfly to Stoney Lane Bridge
	Section of footpath along canal alignment through fields to Stoneyford bridge poorly marked but with pleasant rural aspect.	Improve marking and interpretation of public footpath along line of canal. Consider providing additional new mixed use path along river
	Well marked path (muddy in places) through Erewash Meadows LWS (for migrant birds and waders), also contains significant remains of canal and other heritage structures	Improve path, manage and interpret remains of historic structures better. Manage canal as habitat, but in a manner which would be consistent with future restoration.
End of infill to Pinxton Arm junction	Canal itself pertly silted but in water with extensive reeds	Manage waterspace to balance heritage and visitor value of it appearing canal-like with its potential as a habitat
	Remains of Portland Basin adjacent to Jacksdale LWS.	Consider provision of a bridge on site of former aqueduct to link Jacksdale, the LWS, the former Portland Basin and the canal. Provide interpretation and signage.
	Historic remains of Butterley Company Works along west side of canal.	Formalise stepping stones giving access to Butterley Co. side of canal Improve / provide paths and create short circular Butterley Co. heritage walk.
	Codnor Park Lock Flight, appear partly derelict and do not retain water in pounds to full levels	Improve lock flight with better water retention in pounds, upgraded towpath and signage as per “do minimum plus” option
	Ironville / Codnor Park local facilities	Improve signage to and connectivity with Ironville and Codnor Park. Provide information about LWP in local outlets.
Pinxton Arm junction to Tunnel East Portal	Codnor Park Reservoir, wide vistas, car park, burger bar open Weds-Sun.	Could promote canoeing / rowing on reservoir, need to work with Codnor Park Fisheries. Develop circular nature / heritage walk around reservoir
	Former canal at slightly higher level than, but parallel to reservoir.	Opportunity to manage disused section of canal next to reservoir for biodiversity with good access for school visits, etc.
	Section of canal above weir in water through Golden Valley, with generally good towpath.	Limited dredging could open up this length for canoeing and rowing. Promote towpath as part of traffic fee Ironville – Butterley shared use route.
Butterley Tunnel	Heritage of tunnel itself	Provide improved signage and interpretation at each portal. Feasibility study into providing trip boat to operate from Hammersmith to the Wide Hole.
	Horse path from Golden Valley to	Improve signage of this route as

Section	Key Characteristics	Opportunities
	Hammersmith	part of overall shared use path (will need to negotiate permissive right for cycles as this is only public footpath, although route is generally suitable); integrate Hammersmith Meadows and Carr Wood LNRs into DWP and bring Butterley Reservoir into LWP
	Midland Railway Centre	Improve connectivity and co-operation with Midland Railway Centre. Opportunity for displays showing transition from canal to rail haulage.
	Proximity of Horse Path to Ripley Greenway (traffic free cycle route towards Ripley and Derby) at Hammersmith.	Provide connection and signage to/from LWP mixed use path.
Tunnel West Portal to A610	Canal obvious and still in (shallow) water.	Maximise use of water space for habitat and / or trip boat.
	If trip boat access to wide hole provided, terminus and car parking, small visitor centre / museum could be considered on this section.	Include this in feasibility study for trip boat.
	A610 culvert blocks access from this section towards Chesterfield Road.	Investigate options for providing a link including provision of a navigable culvert with path, an underpass, or ramps and a suitable on the level crossing of the A610.
A610 to Chesterfield Road	Canal bed visible and some short sections in water to Lower Hartshay.	Extend water space where possible and provide enhanced habitat. Upgrade towpath where required.
	Section of canal bed infilled and lost between Bridge Lane and Chesterfield Road across open fields.	Liaise with landowners and establish options for purchase / lease of land or agreement to provide shared used path link (the route is a public footpath), and upgrade surface.
	Starvehimvalley Bridge and Railway Bridge	Provide interpretation at historic structures.
	Excavator Public House	Work with owner / tenant to provide clearly signed and surfaced route for shared use path. Maximise benefits of and to pub in publicity material etc.
Chesterfield Road to Brickyard Road	Buckland Hollow Tunnel	Improve link and footpath surface from Excavator Public House, provide interpretation of heritage and geology.
	Encroachment of gardens and parking to rear of houses along Ripley Road	Investigate and resolve encroachment sufficiently to provide shared use path, and with a view to assembling necessary land for possible canal restoration.
	Car park and access road on line	Identify owners of access road

Section	Key Characteristics	Opportunities
	of canal at Brickyard Road	and car park and negotiate to improve public footpath to shared use path along north edge of site to maintain linkage.
	Ambergate and Ridgeway Quarries SSSI (geological interest) is 450m to south of line of canal	Provide signage, interpretation and path link if required to connect SSSI to LWP shared use path.
Brickyard Road to Transco	Gauging narrows at Sawmills	Clear narrows and provide interpretation
	Missing structures over A610 and railway	Investigate options for linking LWP shared use path across A610, railway and river. Provide interpretation showing former structures
	Section of canal in water at Bullbridge	Maximise use of water space for habitat – links with Fritchley and Ambergate Primary Schools?
	Stevenson's Yard and Transco Depot	Provide shared use path on line of public footpath in short term, contribute to and steer plans for redevelopment of the area
Ambergate to Cromford	Canal in water, Cromford Canal SSSI	Work together and take advice to identify the extent of dredging desirable for the SSSI and then specify appropriate navigation use between Cromford and Whatstandwell and/or Ambergate (e.g. shallow drafted electric powered tour boat and canoe access). Develop navigational offer and use this as an additional means of exploring and interpreting the SSSI. Form a management group specifically to identify and address the conflicts involved in managing this section of the canal for wildlife, heritage and navigation.
	Shining Cliff Woods SSSI	Develop 4 to 5 miles circular walk linking the two SSSIs from Whatstandwell station using LWP shared use path, bridges at Whatstandwell and Ambergate and paths / tracks through woods to bring woods site and river into LWP.
	Whatstandwell Station	Improve signage and links between station and LWP. Work on cross promotion with East Midlands Trains
	Lea Wood (Pumping Station and Aqueduct) and High Peak Wharf	Develop and implement cohesive visitor plan for these sites which are close together and form a "heritage honey pot" working with world heritage site and DWT to provide interpretation and

Section	Key Characteristics	Opportunities
		promotion.
	Cromford Wharf	Work with Arkwright Society, café etc. to promote Cromford wharf as both a visitor honey pot and access point to the LWP. Provide signed route to Cromford Station and to the town.
	Around Cromford Wharf	Integrate Peak District Dales SAC, Matlock Parks LNR and Matlock Woods, Masson Hill, Via Gellia Woodlands and Rose End Meadows SSSI sites into DWP.
onward linkages	High Peak Trail towards Buxton with links to Ashbourne[24]	Provide clear route signage and improve connectivity.
Pinxton Arm junction to Pinxton	Well used existing pathway through Pinxton along infilled canal	Upgrade surface and signage to give consistency with rest of canal and provide shared use path.
	Pye Bridge: infilled canal bridge	Investigate removing infill and reinstating access under bridge to avoid the need to leave the canal and cross the road on the level
	UK Coal site	Work with UK Coal and FCC on basis of current agreement to re-use diversion channel for canal restoration. Provide shared use path alongside diversion channel to link Pye Bridge with existing canal remains at Pinxton Wharf
	Pinxton Wharf	Work with anglers and other users of waterspace at Pinxton Wharf to maximise habitat value and enhance interpretation of the water spaces. Provide suitable signage onwards from site to link into Ashfield District Cycleways.

10.4.1. Notes Regarding Navigation as Part of the LWP

The Ambergate to Cromford section of canal is the best preserved and also subject to a number of statutory designations. The canal is an SSSI. Three areas at the western end of this length are monitored views for the World Heritage site. It is particularly important that any works have no or minimal impact on these monitored views. This length of canal also has the most visitor potential as a free standing canal section. Balancing the needs of wildlife, built heritage and navigation therefore must be done with particular sensitivity.

The best model to approach this is probably the Grand Western Canal from Tiverton in Devon. This was acquired by Devon County Council in the 1970's with a view to creating a country park. The main difference is length; the Grand Western Canal is eleven miles long, whereas this section of the Cromford Canal is only five miles in length. However, very few vessels travel the full length of the Grand Western Canal, and many never move at all. It should be noted that the Grand Western Canal is not a SSSI, although it still has local environmental designations and environmental protection is at the core of its management as a country park.

[24] Proposals by Sustrans and Peak Cycle Links to create a 60 mile 'White Peak Loop' are at an advanced stage – this will link to the Cromford Canal at High Peak Junction – more information is available from http://www.peakcyclelinks.org.uk/route.html

Initially Devon County Council took the view that the canal was sufficiently environmentally sensitive that only unpowered boats would be allowed, and that the only source for these would be rowing boats hired from the council and a horse drawn trip boat operated by a trust. Navigation was banned altogether on the length furthest from Tiverton, a somewhat academic rule as the trip boat never went that far and all but the sturdiest of rowers would struggle to row a 22 miles round trip in a day's hire.

In time however, Devon County Council have developed this resource by developing a holiday area with caravans and chalets, thus giving a revenue stream, and allowing greater access to the water. A gradual approach of increasing access and monitoring the effects has resulted in a small fleet of electric day boats being available, one diesel powered narrow boat for hire (most hirers seem to use it as a floating caravan) and the opening of moorings for private boaters. There is also a slipway. The Council have placed a limit of 2hp per metre length of vessel, and a strictly enforced wash limit, thus greater use of the canal is made, revenue streams have been created but the canal is still a valued environmental asset and use has been controlled to a level where the canal is still tranquil.

In this case, such proposals also have to square with the monitored views of the world heritage site. As a result, for example, the ranks of fibreglass boats that can be seen awaiting hirers in Tiverton basin could not be replicated at Cromford Wharf or High Peak junction, and a proposal to implement any such hire scheme would have to find a base away from these two locations

The Grand Western would nevertheless appear to be a model a way forward for the Cromford to Ambergate section, as follows

- Re-water the length near Lea Wood, creating a continuous and unobstructed water course;
- Seek a suitable location for a "holiday" centre alongside the canal;
- Allow the operation of a horse drawn or electric boat, along with the controlled use of canoes and rowing boats, between Cromford and Whatstandwell;
- Initially, navigation could be prohibited between Whatstandwell and Ambergate, but monitoring could be undertaken on the Cromford to Whatstandwell section to assess the impact of navigation with a view to allowing rowing boats and, later, other vessels to navigate through to Ambergate;
- Monitor and relax or strengthen restrictions as needed.

It is important in developing the above to have a plan for the use of the canal if full restoration to Ambergate is ever achieved.

10.5. Recommendations

It is recommended that further work be undertaken to develop and cost this option.

The table includes recommendations for feasibility studies and development work to identify suitable options to overcome some of the physical difficulties involved in creating the LWP and its shared use path. In addition a marketing and branding strategy should be developed.

11.Partial Restoration

This section identifies the works required to restore the canal to navigation from Langley Mill to the east portal of Butterley tunnel and from Codnor Park to Pinxton (these are currently outlined in section 12).

11.1.Engineering and Environmental Issues

11.1.1. Langley Mill

This length is already navigable and does not need significant works other than providing replacement facilities for any ECP&DA facilities that may need to be moved to allow through navigation

11.1.2. Langley Mill (A 610) to End of Infill

Engineering Considerations

A suitable solution would have to be found to enable the canal to pass from Langley Mill Basin under the A610 Langley Mill Bypass to reach Stoney Lane. One option would be to make use of the existing opening under the road at SK 454478. This carried a railway (since abandoned) under the road, and will have a minimum total clearance of around 3.91m above rail (say 4.05m above the bottom) which would be more than adequate for 1.5m water depth and 2.1m air draft. The works to create this section of canal are included in the restoration proposals for the Smotherfly open casting scheme which was recently granted Planning Consent.

A turning basin would be required at the east end of the opening enabling boats to turn north to access a new cut. This would run through a band of woodland, roughly parallel to the A610 at first, to reach Stoney Lane on approximately the original line at SK 451483. A lock could be provided in this section if necessary to return the canal to the original level at the Stoney Lane crossing.

The alignment of Stoney Lane is problematic at this point with poor visibility. Since construction of the A610, Stoney Lane has become a minor access route serving only one farm west of the former bridge. The road is estimated to be around 1 to 2m above the original canal level. On first inspection, as the road will have low traffic levels, the best solution would be a localised re-alignment to enable a swing bridge to be provided.

There is no engineering reason why the original alignment could not be followed from Stoney Lane right through to the LNER Bridge, however while the original alignment is not obstructed nothing remains to be used in a restoration scheme, and thus this length is effectively a new canal in approximately the same place as the old one.

If the canal were to be restored, the following structures would be required north of Stoney Lane:

- Reconstruction of the canal line to connect the ECDPA length to the in water length at Ironville: we would suggest this would generally be trapezoidal in section with either HDPE or bentonite lining (a vertical edge would be required where boats are expected to moor).
- Replacement (or refurbishment/reconstruction if original structures are still extant but buried) for Locks 13 to 8: these need not be in original locations and could be located to optimise the cut and fill balance and thus minimise construction costs;
- Replacement aqueduct to carry canal over River Erewash;
- A pedestrian or farm access bridge to replace Stoneyford Lane Bridge (this could be a swing or lifting bridge)[25]

The following former structures would not have to be replaced:

- Bentley Bridge (railway abandoned and lifted);
- Slaleys Bridge (turnover for Codnor Park Wharf not now required);
- LNER Bridge (railway abandoned and lifted).

Environmental Considerations

Potential Impacts and Mitigation

Potential impacts of canal restoration works in this section are likely to include loss, severance of habitats within the LWSs; changes to these habitats as a result of hydrological changes and disturbance to the associated species. Mitigation for these impacts could include avoidance of key habitat areas (e.g. by taking the route around the boundaries of these sites), translocation or recreation of habitats, screening and appropriate timing of works. Works could similarly affect species associated with the River Erewash and could result in a risk of pollution, which would have to be controlled. Water from the watered section of canal to the north feeds the wetland areas in this section, so it is important that the source of water for any new canal sections does not adversely affect the hydrology supporting the wetlands in this section.
Increased disturbance could result in adverse impacts on habitats and wildlife, particularly birds in this section.

Opportunities for Nature Conservation Enhancement

The works could create an additional open water habitat, which could complement the habitats present. There may be potential for habitats adjacent to the wildlife sites to be enhanced for nature conservation through appropriate management and habitat creation. Improved access and interpretation could enhance the value of the wildlife sites for visitors, although the number and type of users would need to be limited to avoid disturbance impacts (a proposal for a multi-use trail along the route was objected to by DWT on these grounds). However, this would limit access to a defined corridor for most users as they would simply be

[25] The site of the old railway bridge across the River Erewash might be a better site as it could give more room under the aqueduct, and should be considered as a possible site for throttling Erewash flood water to allow occasional inundation of the Brinsley Meadows.

passing through – admittedly the main disturbance would be during construction, but this could be minimised.

This length of canal does not presently exist and thus it has no distinct habitat of its own. There will be a need to ensure that works do not adversely affect any sites with environmental designations and the usual restrictions on working during the nesting season and similar limitations will apply.

11.1.3. End of Infill to Butterley Tunnel

Engineering Considerations
This section will have to be dredged throughout to create sufficient draft for boats to operate. An initial estimate is that 19,400m³ of material would have to be removed from the 1.6km of canal between the LNER Bridge (39) and the Railway Bridge (38). Testing of the canal bed would be required to establish whether lining would be required and to determine any contamination, and further investigation of the canal walls would also be required to verify their stability.

The Portland Arm would have to be carefully stanked off to prevent loss of water from the canal into the River Erewash: alternatively the basin could be restored as part of a regeneration scheme. The Portland Basin Bridge would require repairs to the west parapet, and a full inspection.

There appears to be a reasonable supply of water into this section of canal. This will be a combination of water from Butterley Reservoir, other seepage into the tunnel, and surface water run-off from Golden Valley, where the canal has replaced the natural watercourse above Codnor Park Reservoir. Monitoring the outlet V-notch weir at the LNER Bridge and the overflow weir south of Portland Basin would be relatively straightforward and would establish the current flow regime. Care would have to be taken to maintain flows to the Erewash Meadows Nature Reserve, but this is not technically difficult or costly.

Six locks are extant but would require significant work to refurbish the structure with new cills, quoin liners, gates, paddle gear, channels, ground paddle chambers and culverts as necessary. The lock walls themselves appear to be in reasonable condition except where masonry from upper courses has fallen into the chambers.

Several of the locks are weired at the upper cill, and these concrete weirs would have to be removed. The lowest lock (7) has been affected by subsidence and now has a fall of around 0.3m[26]. It may not be necessary to reinstate this lock as pleasure craft are generally shallower draft and could probably reach lock 6 if the intervening pound were fully dredged.

Attention should be paid to the retaining walls bordering Lock No 2 Bridge (36), as there appears to be significant defects that if left unrepaired could ultimately threaten the canal and adjoining bridge. A structural assessment of these features is recommended, and some repairs are likely to be required.

A solution will have to be found to replace Top of Flight Lock 1 without adverse effects on flood routing from the reservoir. This will have to be developed in conjunction with British Waterways and their Supervising Reservoir Engineer, and with Codnor Park Fisheries which operates the car park. Lock one could either climb to the original height of the summit, making the canal higher than the reservoir, or could be set at a level that still allows the reservoir to drain into the canal. This solution would, however, mean that an extra lock would be required on both the main line, between the reservoir spillway and Butterley tunnel, and on the Pinxton Arm.

At this point a decision would be needed as to whether to re-excavate the canal or allow boats into the reservoir. Further research is needed into the benefits and disbenefits of each approach. Allowing boats into the reservoir is likely to be an attractive prospect for the boater and also saves having to sever the car park;

[26] There is some doubt over this figure in relation to correct water levels.

however, there may be environmental impacts on the reservoir in terms of boat movements and allowing access for invasive species.

Golden Valley Bridge will have to be replaced. The levels here are such that the canal can be culverted under the road in a box culvert or Armco culvert – this is likely to be the simplest and lowest cost option. Some traffic disruption would be inevitable whilst this work is undertaken.

The canal from Golden Valley Bridge to Butterley Tunnel east portal requires de-silting and/or re-excavation to a level to provide a suitable draft for boats to operate, together with limited investigations into the condition of the bed of canal to determine the requirement for potential new/additional lining. Waterway walls were not evident along this short length, although they may be buried. As a potential bottleneck where boats would wait if the tunnel were restored, suitable mooring would have to be available and this would involve restoring any existing buried walls or constructing suitable new waterway walls.

Environmental Considerations

Potential Impacts and Mitigation
Canal restoration works and usage in this section could result in loss, degradation and disturbance of habitats, but it is likely that the route would still form a wildlife corridor and it may be possible to mitigate for this through appropriate design and programming. Improving the connectivity of the canal to other water bodies and systems could encourage the spread of invasive species (in particular non-native crayfish such as the American signal crayfish and American Mink), which could put localised populations of white-clawed crayfish and water voles at risk.

Opportunities for Nature Conservation Enhancement
Appropriate enhancement and management of usage of the canal could improve visitor appreciation of the natural features along the canal and limit inappropriate use. The scheme could be used to create opportunities to protect the localised populations of water vole and white-clawed crayfish by providing a network of habitats protected from the effects of invasive species.

The canal on this length does provide a habitat and wildlife corridor, although the aquatic environment suffers from being discontinuous and also from the state of the canal around Ironville. It will be necessary to observe normal environmental safeguards during any work and also to undertake a survey prior to commencing work to identify any additional safeguards. Overall however the restoration, if undertaken with care and sensitivity, will improve the environmental quality of this length.

11.1.4. Pinxton Arm

Engineering Considerations

Restoration of the Branch
The course of the canal is largely unobstructed although localised encroachment has occurred in places, Most of the bridges have a large enough opening for navigation although in at least one case this is lower than the historic headroom.

A desk study and possible site investigation may be required to establish whether the deck of Pye Bridge still exists. If so, the bridge may well have to be strengthened to modern standards if the infill is to be removed. If the deck proves to have been removed, there is clearance for a new box culvert to be installed.

Fletcher's Lane crosses the canal line more or less on the level and would be best served with a lift or swing bridge.

Negotiations will be required with Network Rail to gain their consent to re-water the canal under the Erewash Valley Line Railway Bridge (9).

The reinstatement would be similar to that proposed for the Langley Mill to end of infill section, a trapezoidal channel lined with HDPE or bentonite matting. Vertical walls would only be used where necessary to provide adequate width for boats to pass or moor. The Church Hall car park would be greatly reduced in size by the canal restoration, and alternative provision may be required elsewhere.

A new alignment will have to be constructed from the Erewash Valley Line Railway Bridge (9) to the LNER Bridge (12) to replace the section of the branch which was removed during opencast mining operations. Opportunity could be taken to construct much of this section on embankment to provide a receptor site for material excavated elsewhere on the scheme. At the southern end of the section the modern ground profile appears to be significantly below the level of the old canal. If this is done, care would need to be taken to ensure that the canal does not encroach into the flood plain of the River Erewash. It should be noted that this section is a former UK Coal opencast mining site, and that the FCC has worked with UK Coal to develop proposals to form the canal within the old Erewash river diversion and facilitate its use not only for navigation, but also as a habitat, fishery and flood alleviation.

Beyond the former opencast, a crossing will have to be provided for the track at the location of the former LNER Bridge (12). Depending on the levels this could potentially be either a fixed or swing/lift bridge.

The canal bed is generally extant from here to Pinxton Wharf. Minor areas of full canal reconstruction will be required at crossing points/infill areas. The visible section of waterway wall is in need of repair. Generally the canal will have to be excavated to the full depth required and may need to be lined. Sensitive design including natural banks and careful work should enable much of the current wetland vegetation to be retained and used to support the canal banks.

Pinxton Wharf survives in water, and is located such that it could become a nucleus for regeneration of Pinxton and its surrounding area. The wharf would need to be dredged and the integrity of any lining and bank walls established.

Connection to a Restored Main Line

Reconnecting with the main line at the historic location may be problematic unless the main line is reinstated at its historic level, an issue which is discussed in section 11.1.3. If the main line is re-established at a lower level, a lock down will be needed and this is likely to affect the foundations of the junction bridge. There are three options:

- Use of the deviation route proposed as part of the Golden Valley Project (GVP) – this would relocate the canal junction to the reservoir inlet and involve creating a new canal running north of reservoir to return to the original line south of the Butterley Company Bridge (2);
- Use of reservoir for navigation, enabling boats to enter the reservoir from above Top of Flight Lock 1 and cross above the dam into a short new alignment located west of the old spillway on the north west dam mitre, again returning to the original line south of the Butterley Company Bridge (2);
- Remaking the original junction and following the original alignment across the dam as closely as possible – this would probably require an aqueduct from above Top of Flight Lock 1 to Top Lock Bridge to enable reservoir outflows to pass beneath the restored Arm.

The key issues affecting the choice between these options are:

- Engineering risks associated with the reservoir, particularly the stability of the dam itself, and the need to ensure that the flood routing measures put in place following the enactment of the Reservoirs Act are maintained.
- Ecological considerations, particularly with regard ensuring the population of native crayfish within the reservoir remain isolated from encroachment by signal crayfish.
- Operational issues associated with boating across the reservoir close to the dam.

Further study of these issues will be required before the best option can be established.

- A deviation route north of reservoir, suggested as part of the Golden Valley Project (GVP), with the junction relocated to the reservoir inlet;
- Use of the reservoir for navigation effectively using the reservoir as a very large junction pool;
- Original junction and alignment with lock.

It should be noted, aside from any other considerations the historic route is on the crest of the reservoir dam, and consenting and construction any reinstatement of this is likely to be a long an involved process requiring the reservoir Panel Engineer to be involved at all stages.

Water Supply
The Pinxton Arm may have been supplied wholly from the top pound of the main canal line or fed in part from River Erewash or feeders in Pinxton. If the connection point has a lower water level than the historic summit pound level, then the branch would require specific measures for water supply. The simplest solution would be to install a back pumping arrangement at the lock where the branch would drop down to the revised main line level. The only obvious opportunity for an independent supply of water would be to abstract water from the River Erewash, but this would require an abstraction license from the Environment Agency and a small pumping station would have to be constructed.

11.2. Estimated Costs of Partial Restoration

Accurate estimation of likely costs for restoration would only be possible with a much more detailed restoration proposal, so the costs presented below should be regarded as being indicative only.

11.2.1. Capital Costs

The following table has been built up based on experience with previous canal restoration schemes and other relevant projects and with reference to the Binnie report for the section from Langley Mill to Ironville. The rates used are based closely on those used for the restoration of the Lichfield Canal, which is currently in a similar condition to the Cromford Canal, and presents similar key difficulties in terms of key structures. The costings assume the Smotherfly opencast site restoration is undertaken by the developer as part of the planning conditions, and that no significant structural work is required to the former railway underpass beneath the A610 road other than forming the canal channel.

Table 5. Capital Costs for Partial Restoration Option

Task	Quantity	Rate	Cost
A610 crossing to End of Infill – canal line Structures: Six new locks; aqueduct; swing bridge	4,000m 6 no. new locks 1 no. aqueduct 1 no. swing bridge	£1,000 £400,000 £1,000,000 £150,000 **Sub-total**	£4,000,000 £2,400,000 £1,000,000 £150,000 **£7,550,000**
End of infill to Codnor Park Reservoir – canal line Structures: Restore five locks; modify and restore 1 lock; construct new lock and link	2,300m 5 no. restored locks 1 no. modified lock 1 no. new lock Connection	£600 £100,000 £150,000 £400,000 £1,000,000 **Sub-total**	£1,380,000 £500,000 £150,000 £400,000 £1,000,000 **£3,430,000**
Codnor Park Reservoir to Tunnel Portal: canal line Structures: New Golden Valley Bridge, new Car Park lift bridge	1,800m 1 no. road bridge 1 no. mech. lift bridge	£600 £500,000 £300,000 **Sub-total**	£1,080,000 £500,000 £300,000 **£1,880,000**

Task	Quantity	Rate	Cost
Pinxton Arm: canal line re-cut to Erewash Valley Line, re-use flood channel to former LNER bridge; dredging at Pinxton Structures: Pye Bridge, Fletchers Lane, LNER swing bridges Connection to main line[27]	2,200m re-cut 1,100m refurb. channel 900m dredging 1 new / refurb. bridge 2 swing bridges Connection (SUM)	£1,000 £500 £600 £300,000 £150,000 £750,000 **Sub-total**	£2,200,000 £550,000 £540,000 £300,000 £300,000 £750,000 **£4,640,000**
Professional fees, survey costs and project management	Approx. 12.5%	£17,500,000	£2,200,000
TOTAL			**£19,700,000**

At this stage the estimates can only be considered to be very approximate. No risk allowances have been included. The estimate above assumes all of the work required will be carried out by Contractors and Consultants and so there is no account made in the estimate for any work which may be undertaken by volunteers.

11.2.2. Operation and Maintenance

The operation and maintenance costs for a completed restored canal are best estimated by comparison to British Waterways maintenance costs. On canals with few or no locks, figures supplied by British Waterways for the Lichfield Canal feasibility study indicate a general operation and maintenance figure of around £8,000 per kilometre per year (the partial restoration including the Pinxton Arm is around 11km in length).

Lock repairs and renewals (commencing 15 years after restoration of the first lock, and continuing at the rate of one lock every year giving an average service life of 22 years) could be expected to add a further £40,000 per year to the operation and maintenance cost.

Thus the total maintenance costs on completion will be around £88,000 per annum, rising to £128,000 per year once lock gates start to require replacement.

11.3. Benefits of partial restoration

The fiscal benefits of restoration accrue from two main sources:

- Boaters who spend in the local economy during any visit
- Non boaters attracted to the canal by the activity on the water

In addition those who base boats in the area spend money on non-cruising visits: however fiscal benefits from this source would depend on provision of moorings on the canal which has not been addressed in this report.

Visiting boat numbers will be affected by the number of locks needed to reach the terminus at Pinxton. Assuming the restored canal has 14 locks as per the original, the climb from the Trent to Codnor Park entails 29 locks. At present there are no hire boat bases on or near the Erewash Canal.

At present the Erewash Canal sees around 700 lockages per annum (a lockage is one filling of the chamber), rather lower than other Broad Waterways in the Midlands and North and a lot lower than the popular narrow canals. On a canal this quiet sharing locks will be relatively uncommon so we have used the narrow lock factor to estimate the number of boats. This would indicate 4 boats for every 3 lock fillings, or just over 900 two way boat movements, some of which will be boats based on the canal.

[27] For the cost estimate it is assumed that connection to the main canal would be via the reservoir and two shallow locks, with water being back pumped into the Pinxton Arm from the reservoir.

The Erewash Canal has relatively low usage because it is not perceived as having a destination and has an (underserved) reputation for being unattractive and vandalised. A terminus at Ambergate would overcome the first of these. However the sheer number of locks leads us to suggest that the total will no more than double. For the partial restoration to Codnor Park our view is that there would be around 1200 two way boat movements per year.

Research by BW indicates that the average boat has four occupants and this leads to a spend of around £45 per boat per day/night. We would suggest that any boaters making their way would spend one to two nights on the partially restored canal. If we assume 2.0 days therefore, and each journey represents two boat movements (one up, one down) then this represents a visitor spend of £54,000. In addition these boaters will spend a further two nights on the Erewash (in addition to the 700 boat movements that are already occurring) representing a further £54,000

Bankside visitors are more difficult to predict, however the existing baseline, except at Cromford, is very low indeed, and a working figure of 10,000 bankside visitors per mile of canal is used. This is about half the rate of the Kennet and Avon Canal. The length of partially restored canal including the Pinxton arm will be around 7 miles so this would suggest about 70,000 bankside visitors.

BW uses a figure of £10 for every visitor, but as some of these visitors will be local people making a regular visit (i.e. they get counted more than once) this is unlikely. We have assumed that 50% will spend £10 in the local economy that they would not otherwise have done, making a total spend of £350,000 per annum. This is incidental spend and is in addition to any spending for entry to premises or a trip boat ride.

The sums totals therefore are £108,000 per annum into the local economy from boaters, and £350,000 from bankside visitors attracted by the active canal

At present these figures do not include additional boat hire generated by the canal (because there are no hire boat bases on the canal) or any revenue from mooring fees pending a decision as to whether there should be large scale provision of moorings on the partially restored canal (the only sites with potential would be Codnor Park Reservoir – depending on the solution adopted – and Pinxton Wharf). As both boat hire and mooring fees are significant items of expenditure these would greatly increase the amount of revenue to the area around the canal if they could be captured.

11.4.Integrating Partially Restored Canal

If a plan to partially restore the canal is adopted, consideration should be given to treatment of the central and western sections. This could either be as for the “do minimum” or the “linear park and destination nature reserve” option, or a synthesis of the two.

There should also be consideration as to whether a Linear Water Park and Destination Nature Reserve option could sit alongside the Partial Restoration Option.

12.Full Restoration

The issues, costs and benefits of performing a full restoration (as extra over to the partial restoration discussed in Section 11) are set out in this section. This section therefore considers restoration of navigation from Butterley Tunnel East Portal to Cromford.

12.1.Engineering and Environmental Issues

12.1.1. Butterley Tunnel

Engineering Considerations
The Butterley Tunnel is probably the most significant engineering obstacle to a full restoration of the canal to navigation. The tunnel is known to have closed from 1889 to 1893 for repairs to damage caused by subsidence, and collapses in 1900 and 1907 resulted in the permanent closure of the tunnel after it was determined to be beyond economic repair in 1909.

Whilst the accessible sections of the tunnel are not generally in poor condition, many sections must have been suffering from the effects of subsidence or poor ground conditions as there are many sections where shoring has been installed to try to support the tunnel soffit and to prevent the walls moving inwards.

The tunnel is of very restricted dimensions, and to re-open even the sections which could be inspected in 2006 much of the shoring would have to be removed and replaced with supports which would not unduly restrict the air draft available for boat traffic. This could potentially be achieved using a combination of rock anchoring and carbon fibre bonded repair sheets similar to those used on “heritage” bridge structures. There are possibly sections of tunnel affected by subsidence where there is inadequate air draft and these would have to be increased in size using mining techniques.

The health and safety of boaters using the tunnel would be a significant concern, especially given that the tunnel dimensions mean that there would be no way of providing a means of emergency egress (e.g. a walkway). This would suggest that operation would have to be along similar lines to that first used on reopening of Standege Tunnel on the Huddersfield Narrow Canal, where boats were pulled through by an electric tug operated by the navigation authority. This would enable users to be evacuated on the tug in the case of an incident. This would also solve any ventilation issues, bearing in mind Butterley Tunnel never saw powered craft and thus its ventilation was never adapted for them.

It is accepted that tunnels such as Harecastle currently operate with boaters going in under their own power on a restricted bore with no walkway. However these tunnels have never closed and as such have never been subject to the rigorous assessment a newly opened tunnel would be subject to. Butterley would be regarded as effectively a new tunnel and would be subject to a risk assessment as such, whereas a tunnel such as Harecastle can be treated differently on the basis of accident free operation to date.

All of the above, together with the likely cost and the unknown condition of around half the tunnel, mitigates against any restoration proposals which rely on the restoration of navigation via the tunnel.

It might however be possible, at little cost other than that to maintain and operate a suitable vessel, to provide tours from the western portal to visit the interesting industrial heritage in the vicinity of the Wide Hole.

There are two alternative solutions – firstly to provide a replacement tunnel on an alternative (but generally parallel alignment). This would have estimated costs in range £6.50m to £17.05m (depending on the detailed geological conditions) for a replacement 4.88m bore with lighting, ventilation, and an emergency / maintenance access walkway. This would, of course, have to pass through similar geological strata, with a similar legacy of residual stress caused by mining.

The second alternative would be to construct a new canal on a revised vertical alignment, passing up and over the obstruction of the high ground by means of flights of locks. One possible route for this is to follow the southern boundary of the Midland Railway Centre site from the eastern portal; rising up through around eight locks of approximately 2.75m drop each, to reach the B6179 Derby Road at or near SK 401518. A new bridge would be required to take the canal under the road. The canal would then cross Butterley Reservoir on the level, and may be able to pass under the existing bridge on the railway causeway. Leaving the reservoir north of the railway the canal could pass over fields to a large new aqueduct over the deep A38 cutting at SK 396522. A flight of locks would then lower the canal back down to the original level and a junction with the old alignment between the A38 and the A610 Ripley Road.

The figure below shows the western part of the possible deviation.

We recommend that these two options are reviewed; however we would make the following observations regarding each.

A new tunnel probably provides the most satisfactory solution from a navigation perspective: canal users are generally used to long tunnels and will not generally be put off by a tunnel here. In addition, any boaters who reach Ironville will have climbed nearly 30 locks from the Trent, and are unlikely to have an appetite for a further 16 to go over the tunnel

Against this, the tunnel is a single non-divisible engineering item, and construction of this cannot realistically be achieved over multiple phases. For this reason it may never be capable of being funded, whereas the diversion could be phased, starting with reaching Butterley Reservoir which would act as a terminus while funding was found to continue.

Environmental Considerations

Assuming that the original tunnel is not restored then whatever habitats exist within it will be left undisturbed. The key question that would face the proposals would be any impacts on Butterley Reservoir should the diversion route go through it. The impact of this (and of the new route as a whole) would have to be assessed before the route could be adopted.

12.1.2. Butterley Tunnel to A610 crossing

Water Supply
The water supply to this section of the canal would have come from a combination of four sources:

- Surface run-off in Golden Valley (see above);
- Butterley Park Reservoir;
- Butterley Reservoir;
- Lea Wood Pumping Station.

The above and the following comments on water supply apply to the entire canal west of Butterley Tunnel

The surface run-off from Golden Valley is currently not available to fill this section as Butterley Tunnel is blocked and water flows out from the tunnel to each portal. If the tunnel were to be restored then flow connectivity would also be restored as the canal is all on one level above Codnor Park, and surface water collected from Golden Valley would then contribute to providing feed water for this section.

Butterley Park Reservoir has been abandoned and infilled. Some flow which used to feed the reservoir is now discharged by a spillway into the canal bed adjacent to the eastern portal of Butterley Tunnel: the same issues apply to this as to the surface water run-off entering the canal in Golden Valley.

Discussions with British Waterways suggest that the use of Butterley Reservoir to supply water to the canal is practicable. The supply was fed by gravity from the reservoir into the tunnel by an adit which reached the tunnel 550m in from the western portal, providing that flow connectivity can be maintained within the tunnel from the feed adit to the portal. There was good flow connectivity within the tunnel at the date of the last (unofficial) survey in 2006, suggesting that no work would be required within the tunnel itself to restore the feed.

For discussion of Lea Wood Pumping Station, see the notes on the Western Section below. To bring feed water from Lea Wood to this section, connectivity of flow would have to be re-established at Ambergate and Bullbridge. The main feed from the northern end is from the streams in the Via Gellia, and discussion would be required with the operators of Cromford Mill (The Arkwright Society) regarding maintaining water supply.

As previously indicated, historic water supply exists via a culvert and paddle arrangement to take water from the Hartshay Brook underneath the pipe bridge to the west of Butterley tunnel. Adjacent to Ripley Road Bridge (32) the canal is crossed by the treated effluent from Ripley North Wastewater Treatment Works. This could easily be diverted into the canal and remove a pipe crossing at the same time if water quality allowed.

Engineering Considerations
Restoration of this length is relatively straight forward, which channel clearance repair/ replacement of the waterproof lining (assuming this length has one in the first place). Given the height of the cutting faces relative to the canal, it would be prudent to undertake a slope stability analysis prior to any major works in the vicinity of the cutting being undertaken.

A new structure would be required under the A610. This has sufficient clearance to accommodate a box culvert under the carriageway without any need for realignment, although it is unlikely the culvert could be installed without the need to close lanes on the highway. If lane closures cannot be permitted a jacked box culvert solution could be adopted.

Environmental Considerations

The canal here is in a wooded cutting, and while it doesn't have any statutory designations the woodland habitat will be vulnerable to excessive disruption. The usual safeguards, particularly with regard to the nesting season, will need to be applied

12.1.3. A610 Crossing to the Excavator

Engineering considerations
The canal channel varies in whether it is present and what condition it is in. In many places a new channel will be required at the historic water level. All structures are absent except for the bridge under the railway at the excavator, Starvehimvalley Bridge and Ripley Road Bridge. Thus new structures will be need for road crossings near Lower Hartshay.

The canal in this section can be split into two specific sections – the first is where the canal bed is intact between the A610 and Lower Hartshay, and the second is the generally infilled section (although some short bed sections exist) between Lower Hartshay and Chesterfield Road.

The first section where the canal bed is largely intact would have to be re-excavated to appropriate depths, and possibly lined. The main constraints along this specific section are the services which cross the canal in places at grade. These services will require relocation/alteration/diversion by the service providers, which can be a costly process to undertake and deliver.

The section from Lower Hartshay and Chesterfield Road is around a mile long, and requires (apart from short intact sections) a complete new canal construction to replace what has been lost.

This does not remove the constraint of the Excavator Public House Car Park, which lies on the original line of the canal. Suitable and sufficient fencing/public protection measures would be required where the canal line passes through Lower Hartshay, given the close proximity of residential properties. Hartshay Bridge would also require investigation as to condition, and consideration given to the replacement of Malthouse Bridge, given the line of any reconstructed canal in this specific area could sever access to cultivated agricultural land.

Water Supply
Water for the canal in this specific area could be provided (or discharged) into the adjacent Hartshay Brook, or fed from Butterley Reservoir.

Environmental Considerations
As a general rule, this length has a number of separate habitats with no real unity as a result of the fragmented nature of the canal channel. Restoration offers the opportunity to rectify this and reintroduce a wildlife corridor to the route

12.1.4. Excavator Public House to Brickyard Lane

Engineering considerations
There are significant engineering obstacles to restoring this length of the canal should the original route be maintained. The first of these is the access to the car park of the Excavator Public House which is built on the line of the canal, and then where the canal route is intersected by a private estate road and estate unit car park prior to Brick Yard Bridge (26).

To pass through the curtilage of the Excavator would ideally involve removal of the railway embankment (the line has been closed) so as to permit a revised layout for the car park and possible general expansion of the curtilage. Buckland Hollow tunnel survives and would avoid need for any new road crossings in this area. However immediately beyond a development incorporating a business blocks the line of the canal and either the canal must be diverted or the business relocated with the restoration scheme meeting the costs.

Although part of the canal bed behind cottages fronting the A610 has suffered encroachment by garden extensions and parking areas, there are no engineering issues to preclude restoration of the canal along the original line in this area. Land ownership issues would need to be considered at an early stage if restoration

of the navigation is proposed in this area. Alternatively the disused course of the railway is nearby and this could be followed. The legality of the garden encroachment should be explored.

At Brickyard Lane, restoring the canal route through the private estate road (and connecting car parks) would require the building of a new road crossing. There appears to be little level difference between the canal and the private estate road, preventing the construction of an overpass or bridge. On first inspection, the best solution would be a localised re-alignment to enable a mechanised lifting bridge to be provided. Given the nature of the businesses this would have to be a 44 tonne mechanised structure, and agreement would be needed from the businesses affected. It may be preferable to find an alternative access arrangement via a fixed bridge.

Significant excavation and waterway wall construction on the line of the canal would be required along all of this canal section, as the majority of the route visually can be described as a shallow, vegetated ditch with little or no structure. Lining may also be required, depending on ground conditions.

Structural assessments should be undertaken on both the condition of the tunnel and adjoining cliffs at Buckland Hollow, and the retaining wall to the west of the tunnel. Slope stability assessments should be undertaken on the railway embankment where the toe borders the canal, ensuring satisfactory stability.

Environmental Considerations
The route has no environmental designations and much of the route is effectively unmanaged vacant land. The usual safeguards will be required to ensure that any habitats are protected or the impacts mitigated. However, overall this length represents the opportunity to provide an improved habitat and wildlife corridor

12.1.5. Brickyard Lane to Transco

Engineering Considerations
The channel from Brickyard Lane towards the A610 will need to be excavated; some tree felling and ground clearance has already taken place. The canal will then need to be re-excavated along the edge of a garden before it crosses the A610 via a new high level aqueduct extending across the road and the railway line. Practically, this structure would probably be formed of two separate structures with a central substantial pier or embankment. Clearance over the highway of at least 16 feet (5.5 metres) would be required. Network rail will advise on clearance over the railway but at present at least 5 metres is anticipated. These clearances may not be readily achievable in which case there are at least three options.

1) Realign the canal to a location where the clearances are available: this may have impacts on surrounding development

2) Build the aqueduct in the form of a “lift lock” (the opposite of a drop lock) where boats enter an elongated chamber which then has the water level raised to allow passage

3) If the difference between the required clearance and the available clearance is marginal, explore the use of innovative materials and techniques such as carbon fibre

In addition it may be possible to lower the road surface slightly. This would not be practical for the railway however.

Two properties built on the line of the aqueduct prevent restoration to the original canal route. The only possible diversion route is a major new canal construction along the route of a former car park area. Part way along the former car park, the canal can be routed into a new aqueduct constructed on piles over the side of the former aqueduct embankment. The aqueduct will pass over the top of a row of terraced houses and in close proximity to a caravan parking area alongside the Drovers Way arch before it connects to the new rail and road aqueduct. This combined road, rail and alignment diversion aqueduct will be a considerable engineering undertaking.

The channel from the aqueduct to Bull Bridge crossing will need to be dredged and the canal lining assessed. Stevenson's yard is currently being demolished and a new alignment will need to be found to allow the canal to be renovated before the site is re-developed. The Transco yard will need to be relocated or a canal diversion identified. The Transco yard area would make a good marina site.

Mansell Architects has been developing a scheme for regeneration of the industrial area of Bullbridge based around the canal restoration for some time. It should be noted that this scheme has no official status but it does provide an illustrative concept of what might be achieved. At present this would require businesses to be relocated elsewhere, but if National Grid ceases to use its yard the scheme would become significantly more attractive. The key plan is reproduced in Appendix B of this report. If implemented this would make a restored canal the centrepiece of a new mixed use development and provides significant mooring spaces. In addition, much of the canal infrastructure could be delivered or funded by developers as planning gain.

Environmental Considerations

The route has no environmental designations and much of the route is effectively unmanaged vacant land. The usual safeguards will be required to ensure that any habitats are protected or the impacts mitigated. However, overall this length represents the opportunity to provide an improved habitat and wildlife corridor, particularly if the Transco site becomes vacant and is used for a marina or moorings – areas of this could be developed as new habitat.

12.1.6. Transco to Cromford Wharf

Water Supply
Water feed to this section would (as is currently the case) be reliant on water abstracted from the River Derwent, until a connection with Butterley Tunnel (and therefore Butterley Reservoir) could be made. An abstraction license from the Environment Agency would be required.

Based on its current (restored) operating regime, the historic pumping station at Lea Wood can supply around 850,000 litres of water per hour to the canal – the high pumping capacity was necessitated by a restriction on pumping when the canal was active. Water could only be pumped from the Derwent between 8pm on Saturday and 8pm on Sunday due to the water needs of mills and factories also reliant on the river. The pump will be run for up to five hours on eleven dates in 2011. Were an abstraction from the River Derwent to be the main source of water for any restored section of the canal it would be likely to be more economic to install an electric pump which could now run at a reduced flow rate for longer periods.

Engineering Considerations
It is estimated that to make the canal navigable for one way travel by narrow boats up to 12,000 cubic metres of silt might have to be removed. Aside from the environmental issues associated with this, this may well reveal leaks and instability in the canal bed.

Derbyshire County Council has plans in place to rectify the problem at the aqueduct.

All structures would need an inspection prior to reuse for navigation, although all appear sound at present.

Environmental Considerations

Potential Impacts and Mitigation
While is seems unlikely that the effects of canal restoration works, such as disturbance or hydrological changes, would affect the Peak District Dales SAC due to its separation from the Cromford Canal by the River Derwent, a full assessment would be required to determine whether there are likely to be any significant impacts.

It is an offence to carry out any operations likely to damage a SSSI without having obtained consent from Natural England. Therefore any works that could result in adverse impacts on the Cromford Canal SSSI would need to be determined in close consultation with Natural England.

LNRs are given protection through policies in the Local Development Plan; proposals that would potentially affect a LNR would need to provide a detailed justification for the work, an assessment of likely impacts, together with proposals for mitigation and restoration of habitats lost or damaged.

Any works along this section of the canal have potential to cause damage to habitats and disturbance to wildlife associated with the canal corridor, both during works and as a result of increased visitor pressure. Increases or changes to public use could affect the towpath margins of the canal. Ongoing maintenance of the canal could also cause damage and disturbance in the long term.

The habitats within the canal are relatively sensitive to management and could be affected by inappropriate management, such as

- excessive or insufficient cutting of towpath margins;
- excessive or inappropriate hand dredging of marginal habitats;
- removal of deadwood (on land and submerged);
- excessive or insufficient maintenance of overhanging trees.

In order for the canal to be used for any boating activities it is likely that a significant amount of dredging and potentially water level management will be required. While dredging of the central channel may be advantageous in maintaining flow and the gradation of marginal habitats, the likely result will be narrowing of vegetated margins and subsequent loss of area and diversity. Any dredging would require careful planning to ensure these habitats are maintained and impacts on rare species are avoided. Disused turning basins have become vegetated with extents of reed bed and fen vegetation, which would be lost if the basis were reinstated for boat use. Similarly an increase of water level could result in a loss of marginal habitats, although allowing sections to silt up or dry out is likely to have adverse impacts on the diversity of habitats.

Excessive boat use would create considerable disturbance to wildlife within and adjacent to the canal and would be likely to degrade the habitats present, although low levels of use could help to maintain the channel and prevent siltation.

Increased usage and connectivity of the canal could encourage the spread of invasive species.

Opportunities for Nature Conservation Enhancement

The current Management Plan employed by Derbyshire Council was produced in consultation with DWT and provides a framework for maintaining and enhancing the site for nature conservation. However, any proposals for restoration and enhancement of the canal provide an opportunity to revise and improve this plan. Monitoring of the effects of current management would be valuable in determining future management.

Potential opportunities for nature conservation enhancement include:

- Improvement and control of access through improved or restricted paths, circular routes, access to adjacent sites and interpretation to enhance visitor appreciation of wildlife features;
- Protection, extension and improved management of towpath vegetation;
- Protection, extension and improved management of marginal and emergent vegetation;
- An appropriate level of dredging to maintain flow of canal and prevent excessive siltation could be beneficial - monitoring of previously dredged sections would be important in determining the true effects of dredging;
- Management of water levels could improve habitat quality and diversity and there is potentially scope for improving habitats for submerged aquatic plants, although inappropriate changes to water levels would be likely to damage the existing habitats;

- Enhancements for water voles and invertebrates through targeted habitat enhancement;
- Improved habitat links through creation and enhancement of habitats adjacent to the canal corridor;
- Removal of invasive species.

12.2. Estimated Costs of Full Restoration

12.2.1. Capital Costs

These costs have been developed in the same way and are subject to the same riders as those presented in section 11.2.1.

Table 6. Capital Costs for Full Restoration Option

Task	Quantity	Rate	Cost
A610 crossing to End of Infill – canal line Structures: Six new locks; aqueduct; swing bridge	4,000m 6 no. new locks 1 no. aqueduct 1 no. swing bridge	£1,000 £400,000 £1,000,000 £150,000 **Sub-total**	£4,000,000 £2,400,000 £1,000,000 £150,000 **£7,550,000**
End of infill to Codnor Park Reservoir – canal line Structures: Restore five locks; modify and restore 1 lock; construct new lock and link	2,300m 5 no. restored locks 1 no. modified lock 1 no. new lock Connection	£600 £100,000 £150,000 £400,000 £1,000,000 **Sub-total**	£1,380,000 £500,000 £150,000 £400,000 £1,000,000 **£3,430,000**
Codnor Park Reservoir to Tunnel Portal: canal line Structures: New Golden Valley Bridge, new Car Park lift bridge	1,800m 1 no. road bridge 1 no. mech. lift bridge	£600 £500,000 £300,000 **Sub-total**	£1,080,000 £500,000 £300,000 **£1,880,000**
Replacement tunnel parallel to line of existing tunnel	2,786m	£2,333 to £6,120 assume £3,800[28]	**£10,590,000**
Butterley Tunnel to A610: canal line Structure: box culvert under A610	500m 60m long culvert	£600 £10,000 **Sub-total**	£300,000 £600,000 **£900,000**
A610 to Excavator PH: canal line (700m in water; 1,200m not) Structures: replace Malthouse Bridge, upgrade Hartshay Bridge Services diversions	700m 1,200m 1 no. new road bridge Repair 1 no. bridge Services	£600 £1,000 £400,000 £100,000 £200,000 **Sub-total**	£420,000 £1,200,000 £400,000 £100,000 £200,000 **£2,320,000**
Excavator PH to Brickworks Lane: canal line Structures: new lift bridge, refurb. tunnel and retaining walls Accom. Works to car park areas	1,000m 1 no. mech. lift bridge Tunnel and ret. walls Relocate 2 car parks	£1,000 £500,000 £100,000 £75,000 **Sub-total**	£1,000,000 £500,000 £100,000 £150,000 **£1,750,000**
Brickyard Lane to Transco: canal line to aqueducts Structures: aqueduct across road and railway; embankment over river	400m Road / rail aqueduct Embankment, 100m	£1,000 £3,000,000 £2,500 **Sub-total**	£400,000 £3,000,000 £250,000 **£3,650,000**

[28] £3,800 is assumed as it represents the most likely out turn cost given the information presently to hand.

Task	Quantity	Rate	Cost
Brickyard Lane to Transco: canal from River Amber to western boundary of Transco site including Hag Tunnel and Marina(s)			Assumed to be delivered through planning gain
Ambergate to Cromford: canal line spot dredging[29] and wall repairs Investigate and repair Lea Wood embankment Mitigation and enhancement of SAC site	9,000m Embankment, SUM Environment, SUM	£200 £200,000 £200,000 **Sub-total**	£1,800,000 £200,000 £200,000 **£2,200,000**
Pinxton Arm: canal line re-cut to Erewash Valley Line, re-use flood channel to former LNER bridge; dredging at Pinxton Structures: Pye Bridge, Fletchers Lane, LNER swing bridges Connection to main line[30]	2,200m re-cut 1,100m refurb channel 900m dredging 1 new / refurb. bridge 2 swing bridges Connection (SUM)	£1,000 £500 £600 £300,000 £150,000 £750,000 **Sub-total**	£2,200,000 £550,000 £540,000 £300,000 £300,000 £750,000 **£4,640,000**
Professional fees, survey costs and project management	Approx. 12.5%	£38,910,000	£4,890,000
TOTAL			**£43,800,000**

At this stage the estimates can only be considered to be very approximate. No risk allowances have been included. As for the partial restoration option, the estimate above assumes all of the work required will be carried out by Contractors and Consultants and so there is no account made in the estimate for any work which may be undertaken by volunteers.

12.2.2. Operation and Maintenance Costs

A similar methodology to that given in section 11.2.1 has been applied with the length of the entire canal including the Pinxton Arm being taken as 27km. It is assumed that a replacement tunnel is constructed for this purpose and that there would be no extra over maintenance costs for the foreseeable future due to the newness of this structure.

The total maintenance costs on completion would be around £216,000 per annum, rising to £256,000 per year once lock gates start to require replacement.

12.3. Benefits of full restoration

Benefits have been calculated in a similar way to the benefits for partial restoration (see section 11.3).

We have made a working assumption that navigation will be restricted on the length from Cromford to Ambergate. This may take the form of controlling boat numbers by, for example, pre-booking and requiring one way transit (say to Cromford on even numbered days and from Cromford on odd numbered days) or by building a new terminal basin at Ambergate, those boaters wishing to go further transferring to a passenger boat for the final length. In practice the second scenario involves boaters spending two nights at Ambergate whilst the first would entail one night at Cromford and one elsewhere.

The Erewash Canal has relatively low usage because it is not perceived as having a destination and has an (underserved) reputation for being unattractive and vandalised. A terminus at Ambergate would overcome

[29] The rate for spot dredging includes for disposal and landfill tax.
[30] For the cost estimate it is assumed that connection to the main canal would be via the reservoir and two shallow locks, with water being back pumped into the Pinxton Arm from the reservoir.

the first of these. However the number of locks leads us to suggest that the total number of boat movements will no more than double. With full restoration to Ambergate our view is that there will be around 1,800 two way boat movements per year. Movements to Ambergate/Cromford will be significantly higher if there is a marina on the Cromford Canal itself.

Research by BW indicates that the average boat has four occupants and this leads to a spend of around £45 per boat per day/night. We would suggest that any boaters making their way would spend three to four nights on the canal, two at Ambergate (or one at Cromford one at the Excavator) and one at Codnor Park / Pinxton with a possible extra to avoid travel from Langley Mill to Ambergate in one day. If we assume 3.5 days therefore, and each journey represents two boat movements (one up, one down) then this represents a visitor spend of £141,750. In addition these boaters will spend a further two nights on the Erewash (in addition to the 700 boat movements that are already occurring) representing a further £81,000

Bankside visitor numbers have been predicted using the methodology described in section 11.3. The length of fully restored canal including the Pinxton arm is around 16 miles, but the length of the tunnel (1.75 miles) should be deducted so this would suggest about 142,500 bankside visitors: note, if a new tunnel is constructed at Butterley the length of it needs to be deducted as visitors can't visit that bit.

BW uses a figure of £10 for every visitor, but as some of these visitors will be local people making a regular visit (i.e. they get counted more than once) this is unlikely. We have assumed that 50% will spend £10 in the local economy that they would not otherwise have done, making a total spend of £712,500 per annum. This is incidental spend and is in addition to any spending for entry to premises or a trip boat ride.

The sums totals therefore are around £220,000 per annum into the local economy from boaters, and £710,000 from bankside visitors attracted by the active canal

Again, these figures do not include additional boat hire generated by the canal or any revenue from mooring fees. As both boat hire and mooring fees are significant items of expenditure these could greatly increase the amount of revenue to the area around the canal if they could be captured.

13.Summary and Conclusions

While the available resources and a number of options have been identified and reviewed, drawing a conclusion from them is not easy. We have considered what each of the options means for the canal corridor as a whole and for the locations affected along the route. Each of the options was considered on an equal basis and we have presented them here in the order which logically fits the overall direction that we have ultimately felt fit to advise should be followed. Thus they are considered in the following sequence

- Do Minimum (existing situation);
- Do Minimum Plus, including implementing existing proposals at Smotherfly, some limited improvements in the Ironville Locks / Jacksdale area, and developing the next stage;
- Implementing the Linear Water Park and Destination Nature Reserve option;
- Partial Restoration from Langley Mill to Golden Valley and Pinxton;
- Completing the restoration from Golden Valley to Ambergate and Cromford;

Our consideration of each is presented below

13.1.Do Minimum

Do Minimum has been defined in similar terms to the treatment of remainder waterways: the minimum that can be done while still fulfilling statutory obligations and public safety requirements. This works for several lengths of canal, basically those that have been filled in. In addition, no other option offers a realistic alternative to “do minimum” for the historic structure of Butterley Tunnel, save perhaps a partial refurbishment to allow controlled access by a trip boat from the west end of the tunnel as far as the Wide Hole[31]. For the infilled sections, Do Minimum does not offer any opportunities to the locations affected, but it does not represent any threats either.

13.2.Do Minimum Plus

At Ironville / Codnor Park, Do Minimum means continuing with a liability that is costing the public purse a lot of money, while offering very little back to the community surrounding it. The lengths in question may well be owned by BW, but with their forthcoming change in status and the coincident reduction in core funding it is not realistic to expect BW to actively seek any upgrading of the canal here. There are two options if the canal is not to continue as a liability to the community around it: enhancement or elimination. Both of these would cost more than the status quo and could have to be funded by someone other than the current owner.

Elimination may not even be practical given the canals status as a flood relief channel for Codnor Park Reservoir, although any option other than the status quo depends on an assessment as to whether the flood channel needs to be retained in its present form.

There are other obstacles to elimination, mainly political. Elimination of canals passed out of fashion in the early 1960’s, and it is doubtful if any wholesale elimination in the interest of public safety and amenity has been undertaken since the 1970’s. Those bits that have been lost have been for major infrastructure schemes and for regeneration, and were not in water and recognisably restorable at least cosmetically. The political fallout for any authority that authorises the destruction of over a mile of in water canal with six lock structures and includes part of a local wildlife site on the basis that it is either unsafe or degrading to the local area is likely to substantial. Not only will the waterways lobby oppose it, but other bodies may notice and

[31] It is recommended that this possibility be investigated as part of the development of proposals for the Linear Water Park.

draw more damaging conclusions: can such a body be trusted with funding for heritage or nature conservation projects for example?

Thus for this one length, Do Minimum is not an option for the local community, and removing the problem by removing the canal may not only be impractical but unwise.

The other alternative is enhancement: again this will need funding over and above that currently required for maintenance. In view of the above comments about the alternatives on this one length, then it would appear that some form of intermediate restoration is advisable here at least.

The Cromford to Ambergate Length, while in no way resembling the Ironville Length, would also benefit from going beyond a “do minimum” approach. In this case more because the length of canal in question carries more liabilities due its status as a SSSI, and also as part of the World Heritage Site for the Derwent Valley Mills. Thus our recommendation is again that this length at least should not be treated simply as a management issue, but that more should be made of the canal here as a visitor attraction and as a source of revenue for the owners.

A third section that is recommended should go beyond Do Minimum is the FCC proposals for the Smotherfly Scheme, where it is proposed to reinstate the canal across the Smotherfly opencast site. This scheme has gathered momentum over the last five years and it would not be appropriate to recommend against it without good reason.

Finally if this option is pursued as an interim stage on the way to forming the Linear Water Park and Destination Nature Reserve, the this would be the time to undertake the necessary study and project definition and development work to facilitate delivery of the LWP/DNR. All of the above tasks are consistent with this either as a final objective or with the development of the Park and Reserve as a further step on the way to partial or full restoration. The key issue for the LWP is identifying routes and securing landowner agreements for shared use path links where there is only a public footpath across privately owned land at present. This should be done so as to not prejudice the possibility of canal restoration at a future date, and , if land purchase is involved, adequate land should be sought to make delivery of the canal restoration as well as the shared use path possible.

13.3. Linear Park option

The Do Minimum conclusions above indicate that there are two lengths of canal where such an approach is not appropriate as it would be detrimental to the interests of the surrounding community (Ironville) or fails to use an asset to best effect (Cromford to Ambergate). We have also indicated that the case for the Smotherfly restoration scheme has already been made by others and we do not see good reason to stand in the way of this project. Under the remaining headings we consider whether the fact that three lengths of canal would be better developed rather than simply managed in their existing state has implications for other lengths of canal.

The first point we note is that of the three lengths concerned only Cromford to Ambergate has significant potential as a standalone entity, although Pinxton to Ironville could see some use. In this way the current situation mirrors much of the canal’s history as local traffic in this area was sufficiently common for trade to continue after the collapse of Butterley Tunnel. Cromford to Ambergate is a reasonable towpath walk with complementary public transport and some limited opportunities for refreshment and other stops along the way. It also serves an area with an existing tourist and leisure trade.

The other two sections identified are not so readily able to sustain themselves, either financially or in terms of general visitor interest. Both are of local interest only and without a wider context may struggle to justify any level of expenditure to either create or maintain them. In addition, features of purely local interest, while providing valuable amenity to local residents, seldom create significant revenue streams into the local

economy, more so when that economy is less affluent and the very area which would benefit most from that spend.

Thus we recommend that these two schemes should form at least “beads” on a chain that takes the form of a path or multi-user route following the canal from Langley Mill to Pinxton. Given that the canal also survives from Ironville Top Lock (the site of which is on this route) to the east Portal of Butterley Tunnel, this leaves an eight kilometre gap between an eastern system of routes following the canal and the isolated Cromford to Ambergate section.

Leaving aside interest in the canal itself linking the two lengths would create a largely off-road route from Langley Mill (and beyond if the Canal Network Towpaths are included) to Cromford and the Peak District, with connection to the High Peak Trail, on the track bed of the Cromford and High Peak Railway, shortly before the terminus at Cromford. Thus an unbroken route could be created from the urban areas to the West of Nottingham to the heart of the Peak District. This is likely to create significant interest and result in higher levels of use, which in turn results in greater benefits to surrounding communities.

13.4. Partial Restoration

Add text.

13.5. Full Restoration

Full restoration has been considered and it must be accepted that restoring the canal to navigation from Langley Mill to Cromford would be a major undertaking that would require substantial funds and take several years to complete. This is not a reason for deciding against restoration. Historically canal restoration has been a slow process, especially once the early schemes of the 1960’s and 1970’s were complete, as these schemes basically involved undoing a backlog of maintenance. The Droitwich Canals reopened this year (2011) after a forty year campaign. Any full restoration of the Cromford Canal is likely to take at least that long. Like most modern restoration proposals, the Cromford Canal needs significant infrastructure provision to be achieved. To summarise the works

- Replace 3km of canal and six locks between Langley Mill and Ironville
- Implement a solution to replace lock one that still allows the canal to act as a spillway
- Recreate the canal channel past Codnor Park Reservoir or allow navigation through the reservoir
- Build a new canal over Butterley Tunnel or bore a new tunnel
- Reinstate the canal from Butterley Tunnel to Ambergate, some 5km including a new aqueduct at Sawmills

In addition use of the existing Cromford to Ambergate Section is less than straightforward if it is connected to the rest of the system. As a whole, full restoration offers greater benefits than any other option, but at a substantial financial outlay: however for Cromford to Ambergate it can be argued that full restoration offers fewer benefits and unless subsequent use is very carefully controlled could substantially harm both the ecology and the existing amenity of this length.

There are combinations of full restoration and interim options that can be pursued, whereby some lengths of canal are fully restored but not others.

13.6. Overall Conclusion

Given the range of scenarios that have become apparent we are not in a position to simply identify a single option and state that it should be pursued. We acknowledge that full restoration is a major and expensive task and is further complicated by question marks over the acceptability of full restoration for the last 8 kilometres to Cromford. Thus we conclude that full restoration should remain an aspiration for the long term

future, whilst accepting that setting a timescale for its achievement is a difficult task. We recommend that canal asset should be developed in the following stages:

13.6.1. Stage One:

- Maintain and improve the Cromford to Ambergate section, for the benefit of wildlife habitats along the entire route and for limited navigation (suggest unpowered boats including trip boat) between Cromford and Gregory Dam;
- Undertake basic clearance and enhancement works at Ironville Locks to a standard that allows subsequent restoration;
- Identify routes and secure landowner agreements for shared use trail links between Langley Mill and Ironville, along Pinxton Arm and from Butterley Tunnel East Portal to Ambergate (to facilitate stage 2);
- Progress existing proposals for restoration of the Smotherfly Opencast section, and for the former British Coal site between Pye Bridge and Pinxton.

13.6.2. Stage Two

- Construct / complete shared use trail throughout and launch Linear Water Park / Destination Nature Reserve;
- Possibly dredge sections at Jacksdale and in Golden Valley to provide further angling and unpowered boating opportunities.

13.6.3. Stage Three

- Full Restoration Langley Mill to Codnor Park, and onwards subsequent interim termini to be
  - Pye Bridge
  - Pinxton
  - Golden Valley

This in effect completes partial restoration.

13.6.4. Stage Four

- Full Restoration to Ambergate, dependent on redevelopment at Bullbridge: operational regime from Ambergate to Cromford to be established prior to opening

13.7. Timescales / Programme

It should be emphasised that the above is not a recommendation for full restoration. The linear park is achieved at the end of stage two and a decision could be made to stop at that time, similarly partial restoration is complete at the end of stage three, and the scheme could stop there. It should also be noted that there is a significant time shift on the completion of each stage. Stages one and two could be implemented in about five years. More realistic timescales for stages three and four is thirty to fifty years. In such a long timescale the entire context of canal restoration may alter. For example, when the campaign to reopen the Droitwich Canal began in 1971 the last referendum on membership of the EU was still four years in the future, privatisation was an alien concept, environmental assessments were unheard of and lottery funding wouldn't be seen for another 22 years. Change on a similar scale, the character of which cannot be predicted, will occur over the next forty years.

Appendices

Appendix A. Map of the Cromford Canal

The map overleaf is reproduced by courtesy of the Friends of the Cromford Canal.

Appendix B. Bullbridge Redevelopment

Proposal drawing courtesy of Mansell Architects Limited.

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