

Next Navigation East:

Part 10: Design Elements I: Route, Levels and Land Requirements

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10 Design Elements I: Route and Land Requirements

10.1 Introduction

- 10.1.1 This section sets out the design elements for the restoration and reinstatement of the Chesterfield Canal between Killamarsh and Kiveton Park.
- 10.1.2 A design element is a unit of construction and/or a style of construction.
- 10.1.3 Design elements describe the key components of the canal plan which are intended for use in more than one location and which are repeated along the waterway. This includes key dimensions, overall styles and materials of construction, the design of the canal channel, the towpath and all canal “fixtures, fittings & furniture” including those required for the safe operation of the canal.
- 10.1.4 The design of the canal reinstatement – both the restoration of existing structures and the construction of “new build” is governed by the guiding principles of the Conservation Management Strategy outlined in Part 9. To that end planning will take the history and ecology of the canal into account to arrive at design elements which can be employed to produce additions which, while clearly modern, harmonise with the existing structure and its environment.
- 10.1.5 The Design Elements will ultimately govern the overall look and feel of the waterway and influence its final character. They also, to a very great extent, determine the overall costs of construction works and the long term maintenance and renewal costs.

10.2 Design Best Practice

- 10.2.1 The design information given here is based on established best practice from British Waterways, the Environment Agency, Derbyshire County Council and the Association of Inland Navigation Authorities.
- 10.2.2 Further evidence of best practice has been sought from the reports and studies undertaken by other major canal projects elsewhere in England and Wales. Of particular value were studies for the Montgomery Canal, the Cotswolds Canals and the Droitwich Canals. These projects are at different stages in implementation and have been useful in establishing a feasible “road map” for the delivery of the Chesterfield Canal restoration.
- 10.2.3 Informative comparison has also been drawn with European and North American waterway projects of international standing. These provide our aspirational benchmarks.
- 10.2.4 Some of the key sources of best practice employed in this study are listed below and overleaf.
- 10.2.5 In addition the advice of professionals working on other canal projects was sought through peer reviews by “critical friends” most notably officers of British Waterways.

Waterways Restoration: Key Sources of Best Practice Design Advice

British Waterways 1999 **Design Manual: Volume One: Buildings and Facilities.** Waterway Environment Services, Hatton Locks.

British Waterways 1999 **Design Manual: Volume Two: Repair and Conservation.** Waterway Environment Services, Hatton Locks.

British Waterways 1999 **Design Manual: Volume Three: Landscape.** Waterway Environment Services, Hatton Locks.

British Waterways 2000 **British Waterways and Biodiversity – A framework for waterway wildlife strategies.** Waterway Conservation & Regeneration Group, Hillmorton , Rugby.

British Waterways 2003 **Waterways Access for All: Waterways Access for All Policy, Design & Guidance.** Waterway Conservation & Regeneration Group, Hillmorton , Rugby.

British Waterways 2004 **Water Ways – Inland Waterways and Sustainable Rural Transport** A good practice guide produced by British Waterways and the Countryside Agency in association with the Environment Agency and the Association of Inland Navigation Authorities.

Waterways Restoration: Some Best Practice Comparable Studies

British Waterways 2004 **Kennet & Avon Canal Conservation Plan.** British Waterways.

Montgomery Canal Partnership 2005 **Montgomery Canal: Regeneration through Sustainable Restoration (A Conservation Management Strategy).** Montgomery Canal Partnership & British Waterways Wales & North West.

Cotswolds Canal Partnership 2005 **Cotswolds Canals Renaissance Phase 1: Project Atlas.** Cotswolds Canal Partnership.

Eire Canalway National Heritage Corridor Commission 2008 **Eire Canalway National Heritage Corridor Preservation and Management Plan.** United States Department of the Interior National Parks Service. Appendices on CD Rom.

Waterways Restoration: Applicable National Standards

ADA / Natural England 2007 **National Guidance for Internal Drainage Boards: Mitigation Measures for Water Voles.** Association of Drainage Authorities. Surrey.

AINA 2003 **Defining Waterway Standards: Guidance for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2003 **Managing inland waterway safety risks: A Good Practice Guide for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2003 **Demonstrating the Value of Waterways: A Good Practice Guide to the Appraisal of Restoration and Regeneration Projects.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2005 **Making More of Our Waterways: A Guide for Social Inclusion.**

Association of Inland Navigation Authorities, London & Leeds.

A INA 2005 **Managing Water Resources: A Good Practice Guide for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2006 **Waterway Corridor Studies: A Good Practice Guide for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2006 **Navigation Signs and Symbols: An Industry Standard for UK Inland Waterways.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2008 **Multi-use Towpaths: A Good Practice for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2008 **Harnessing the Potential of Our Waterways: Bringing benefits back to Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2008 **Making Sustainability a Core Value: Guidance for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

AINA 2008 **Dredging: A Good Practice Guide for Navigation Authorities.** Association of Inland Navigation Authorities, London & Leeds.

Baker, D. & Chitty, G. (eds.) 1999 **Managing Historic Sites and Buildings: Reconciling Presentation and Preservation.** Routledge, London.

CABE Space 2004 **The Value of Public Space: How high quality parks and public spaces create economic, social and environmental value.**

Countryside Agency 2005 **By All Reasonable Means: Inclusive access to the outdoors for disabled people.**

Inland Waterways Advisory Council 2008 **Britain's Inland Waterways: Balancing the needs of navigation and aquatic wildlife.** (Report prepared by John Pomfret & IWAC). IWAC, London.

Inland Waterways Advisory Council 2009 **Climate Change Mitigation and Adaptation: Implications for Inland Waterways in England and Wales.** (Report prepared by Jan Brooke and Ian White). IWAC, London.

Inland Waterways Advisory Council 2009 **Social Inclusion and Inland Waterways.** (Report prepared by Jan Brooke and Ian White). IWAC, London.

British Telecom/Fieldfare Trust 1998 **BT Countryside for All: Standards and Guidelines: A Good Practice Guide to Disabled People's Access in the Countryside.** Fieldfare Trust, Sheffield.

Environment Agency 2000 **Navigation Restoration and Environmental Appraisal: A Guidance Note.** Environment Agency, Bristol

Joint Nature Conservation Committee (JNCC) 2005 **Common Standards Monitoring Guidance for Canals.** Nature Conservancy Council, Peterborough. ISSN17438160

Town and Country Planning Association 2009 **Policy Advice Note: Inland Waterways – Unlocking the Potential and Securing the Future of Inland Waterways through the Planning System.** TCPA, London. 34pp.

10.3 Route

- 10.3.1 As noted in Chapter Two the reinstatement of the Chesterfield Canal between Killamarsh and Kiveton poses a number of challenges. The most significant being to secure a route through Killamarsh village and then to secure a route under the M1 Motorway.
- 10.3.2 In both cases the problems have been subjected to detailed independent study by internationally recognised engineering consultancy firms. Solutions have been forthcoming which have then been developed in more detail by the CCP engineering team led by Derbyshire Councils Consultancy and Contracting Division⁽¹⁾. In each case the final routes and engineering solutions presented here represent the development and expansion of the consultants recommendations.
- 10.3.3 It should be noted that the route line shown in the overview map (Appendix D: Foldout Map 1) has been subject to extensive consultation with the local community and has been shaped by local opinion. The communities have been kept informed and consulted via direct mailings (including questionnaires), exhibitions in sports centres and libraries, attendance at local events and galas, evening meetings and open house events designed to let the community meet, and question, the engineers, designers and planners.

The Route Through Killamarsh

- 10.3.4 In January 2004 engineering consultants Jacobs-Babtie were commissioned to undertake a study to identify a route for the Chesterfield Canal through the village of Killamarsh. During 2004 Jacobs-Babtie undertook two major rounds of public consultation and produced a final report in December 2004. This final report is reproduced in full in Volume Two: Supporting Evidence.
- 10.3.5 Jacobs-Babtie identified two routes which were of equal engineering validity – Central Line East and Central Line East. Public support was greatest for the Eastern Option (80% approval rating in last round of consultation) and this was selected as the preferred route.
- 10.3.6 The Central Line East route has been protected in the North East Derbyshire Local Plan and will be carried forward into the Local Development Framework.

Replacing the Norwood Tunnel

- 10.3.7 In July 2007 engineering consultants Arup were retained to undertake a study of the feasible routes for the reinstatement of the Chesterfield Canal between Killamarsh and Kiveton Park.
- 10.3.8 Arup's produced a consultation draft in December 2007 and a final, revised, draft in February 2008. This report is reproduced in full in Volume Two: Supporting Evidence.

Note (1) The DCC Consultancy and Contracting Division is responsible for the design and delivery of all major public civil engineer projects in the County of Derbyshire. Established for over thirty years it employs a staff of nearly 50 specialising in all aspects of civil and structural engineering. The Division was responsible for the design and delivery of the canal restoration between Chesterfield and Staveley which opened in 2003/04.

- 10.3.9 The Arup study noted that central to securing an alternative route was identifying a feasible, cost effective, replacement for the Norwood Tunnel. Arup examined four viable and realistic options for replacing the partially collapsed Norwood Tunnel;
1. Refurbish the former Norwood tunnel under M1
 2. Use the Railway tunnel north of the original alignment
 3. Use Poplar Farm Underpass to the south of the original alignment
 4. Construct a new underpass on the original alignment.
- 10.3.10 Arup used recognised multiple engineering/economic/environmental criteria and indicators to identify the most cost effective and environmentally beneficial route.
- 10.3.11 They concluded that option 3 – use of the Poplar Farm underpass - was the most cost effective solution. The report went on to make a series of recommendations based on this as the preferred route. These are the basis of the work presented in this document.

10.4 Levels

10.4.1 The pound levels of the canal are given in detail in section 11, below. Overall the route proposed here will be a challenging modern version of the bold route advocated by James Brindley when he set out the extraordinary hill climbing route of the original Chesterfield Canal in 1668-69.

Key Elements	Proposed Pounds									
	Lowgates to Old Farm Lock (No.6a)	Old Farm Lock to Top of Killamarsh Flight	Bottom of Killamarsh Flight to Nethermoor Flood gate	Nethermoor Lake*	Top of Moorhouse Locks to foot of Norwood Flight	Top of Original Norwood Flight (West Portal Old Norwood Tunnel)**	Top of Norwood Flight to Coalpit Lane Locks (Summit pound)***	Coalpit Lane Locks to Wales Locks	Wales Locks to Kiveton Locks (Including Kiveton Waters Marina)	Kiveton Locks to Norwood Tunnel East Portal**
Canal Towpath (Bank Level)	56.1	54.1	41.7*	37.4	57.3	78.3	98.3	90.3	86.3	78.3
Water Level (Pound Level)	55.8	53.8	38.0	36.9	57.0	78.0	98.0	90.0	86.0	78.0
Base of Channel (Invert Level)	54.2	52.2	36.4	<i>sill level*</i> 33.8	55.4	76.4	96.4	88.4	84.4	76.4

Figure 10.1 Proposed Pound, Invert and Towpath Levels for reinstatement of the Chesterfield Canal from Killamarsh to Kiveton Park. (Note that the very short pounds between the locks on the Killamarsh & Norwood Flights are omitted).

Notes:

* = Sill level lower to allow for seasonal change in lake level of up to 1.5 m.

** = Former summit pound level & current top pound on restored BW canal.

*** = Level assuming use of unmodified underpass (see underpass options above).

10.5 Land Use (Land Take) Requirements of the Canal

- 10.5.1 The route proposed for the Eastern Division of the Chesterfield Canal restoration extends from the Western edge of Killamarsh to Kiveton Park. The total length of the route is 6442m (6.4 km or 4 miles) of which 53% (3407m) will use the original canal channel and structures and 47% (3035m) will employ new works or require repair of original features so damaged as to be beyond conventional restoration.
- 10.5.2 The route of the proposed canal track from Killamarsh to Kiveton Park is largely delineated by the existing canal track and, where new track is to be created, by extant land boundaries.
- 10.5.3 The Cuckoo Way long distance footpath (a public right of way) follows the proposed canal route for much of this section. On the tunnel top section the new route diverges from the existing path. Once the new canal channel has been constructed it is proposed to formally divert the Cuckoo Way onto the new route.
- 10.5.4 Current land use and habitat along the route is varied (see Appendix A; Table A1). At present the extant un-restored channel and structures which form about 50% of the route are classed as derelict land. A further 15% of the route in Killamarsh and at Kiveton Park Community Woodland has been subject to remediation and is in use as recreational grassland or park. About 29% of the land required, largely composed of the section between the head of the Norwood Flight and the former Kiveton Colliery site is classed as agricultural land. The remaining land has mixed uses including highways and gardens.
- 10.5.5 Reinstatement will involve changes to current land use in this extant corridor. Where variations from the original route are proposed these will involve some additional land take, however these variations will have the same relationship to the surrounding landscape as the original canal and will therefore retain the character of the original.
- 10.5.6 Land holding along the proposed route (see Appendix C; Table C1) is fragmented due the disposal of much of the canal track by British Waterways during the 1970's. Current landowners include the local authorities, major estates, local small holders and, at Kiveton Park, British Waterways. It is the policy of the Chesterfield Canal Partnership to seek effective ownership of the canal corridor through negotiated settlement. The majority of landowners are supportive of reinstatement and negotiations for land transfer through gift, purchase or long term lease are in process for a significant proportion of the route (see Appendix C; Table C1).

Proposed Land Take

- 10.5.7 The land take and land use change required for the reinstatement is discussed further below in terms of land take during construction (including construction access), during operation and following the end of operations. In summary, the total land take for the proposed canal track (both original alignment and new diversionary route) is c.11.11 hectares. This is composed of:

Land Take	Eastern Division: Proposed Project Sections					All Lengths
	Killamarsh Town	Killamarsh East	Norwood	Wales	Kiveton Park	Totals
Section Length (m)	1345	1714	654	875	1847	6442
<u>Average</u> Track width for section (metres)	15	20	20	20	20	<i>na</i>
Section Area (ha)	1.93	2.61	1.52	1.69	3.36	11.11
Existing Track Area (ha)	1.15	2.18	1.52	0.00	3.16	8.01
New Track Area (ha)	0.78	0.43	0.00	1.69	0.20	3.10

Table 10.2 Length and Approximate Area of each project length for the reinstatement of the Chesterfield Canal from Killamarsh to Kiveton Park. Area is a guide only and is based upon actual predicted track widths (see Data Table 1, on CD Rom 1) – the average track width of 20 m for rural sections and 15 m for the urban corridor through Killamarsh is indicative only. The “New Track Area” is the land which will be required outside the original canal line and includes both deviations and replacement channel and structures.

During Construction

- 10.5.8 Construction will normally proceed from within the planned final sustainable land take of the canal. To do this construction will largely employ the canal track for machine access, transport of supplies and spoil and the temporary storage of materials. This track based approach has been successfully employed on practically all recent canal restorations and is supported by a wealth of established practice.
- 10.5.9 If additional temporary land take outside the final sustainable canal track is required this is clearly identified in the relevant planning application. Such temporary land take will be subject to negotiation with the relevant landowner or agency and will be subject to planning restrictions and controls.
- 10.5.10 Construction access to the Canal Track will be via established entry points already in use to maintain the Cuckoo Way and the parallel Trans Pennine Trail. Where additional temporary construction access points are proposed these are identified on the outline reinstatement plans.
- 10.5.11 Where temporary construction access is required wayleaves will be sought from landowners under established protocols. Ground armouring is not expected to be required as construction traffic is unlikely to be heavy. The volume of earth, for example, which may be moved for any one length (even for new build) is unlikely to exceed that for an equivalent length of minor road and is a tiny fraction of that required for trunk road works.
- 10.5.12 The construction of new public highway bridges and such temporary access as may be required to the road corridor will be undertaken according to the requirements of the Highway Agency.

When Operational

- 10.5.13 The land boundaries marked on the detailed design drawings (site plans) show:
- All the land which is required to operate and maintain the canal in a sustainable manner (outlined on the plans as a Single Red Line) for the agreed purposes of conservation and recreation.
 - Such land as may be required for the development of additional facilities for conservation, leisure and business (outlined by a Chain Dashed Red Line).
- 10.5.14 It is not anticipated that any further land will be required along the Killamarsh to Kiveton Park section on a permanent basis. Where ongoing maintenance access is required across existing landholdings long term wayleave agreements will be sought prior to construction.

After Use Has Ceased

- 10.5.15 The reinstatement of the canal is intended to create a sustainable long term operation. The resultant linear water park will provide a living landmark which will preserve an important part of the regions industrial and natural heritage and will benefit local communities for many years into the future. The proposed design of the canal uses proven technologies and traditional materials to ensure the longest possible use life of the reinstated structure.
- 10.5.16 The Chesterfield Canal operated for nearly 150 years and has survived as a landscape feature for 232 years. The eastern end beyond Worksop has operated continuously since 1777. There is no reason to suppose that given a sustainable management regime, and employing traditional materials and techniques, the reinstated canal should not survive for a similar period. We do not therefore propose to make any recommendations as to post closure reclamation or re-use of the canal land use corridor.
- 10.5.17 Notwithstanding our optimism, should at some point in the future the canal again cease to be used for boating, fishing and other water based activities then it will gradually dry out. In the absence of maintenance the structures and the channel – most notably the lock gates and the puddling -- will fail and the through flow of water will cease. This will rapidly reduce the former canal to a series of shallow, largely stagnant, disconnected pools. These will progressively dry out and ultimately, if not otherwise deliberately infilled, will leave the line of the canal as a damp ditch. Provided the canal track retains some coherence as a landscape feature it will, even as a damp ditch, still be a valuable linear wildlife refuge and corridor.

10.6 Land Ownership & Land Acquisition

Land Ownership

- 10.6.1 The current landowners for the canal route and for the land immediately adjacent to the proposed route are given in Table C1.
- 10.6.2 The Chesterfield Canal Partnership shall use Derbyshire County Council as the land banker for all land transactions (irrespective of location within or outside the county). The long term aim being to vest all canal land in an community interest company

charged with the sustainable management of the waterway (see *Operation and Management*).

- 10.6.3 In some cases, where appropriate, the Chesterfield Canal Trust may acquire and hold land for periods of time while it is being worked upon by volunteers. Again, the intention is that all such land will be vested in Derbyshire County Council as the Canal Partnerships Land agent or directly in the Community Interest Company as is appropriate.

Chesterfield Canal Partnership Policy on Land Acquisition

- 10.6.4 It is the policy of the Chesterfield Canal Partnership that the land along the route be acquired by mutual consent through negotiation. Further, that the price paid be a fair and realistic valuation reflecting both the actual value of the land and the potential uplift in adjacent land values which accrue from the restoration of the canal.
- 10.6.5 The partnership is prepared to purchase land outright or to enter into a long term lease agreement.
- 10.6.6 Where agreement land value cannot be reached the Partnership is prepared to submit to binding independent arbitration on value as a sign of good faith.
- 10.6.7 Where no agreement on land acquisition or long term lease is possible and all other options to secure the route (or a rational alternative) have been exhausted, the Partnership recognises that there are a number of ways to seek powers to compulsorily purchase such land as is required for the completion of the project:
- A Local Authority may take powers under the 2004 Planning and Compulsory Purchase Act.
 - The Chesterfield Canal Partnership (or one of its member bodies) acting as a delivery body may seek an order from the Secretary of State under the provisions of the Transport and Works Orders Act 1992
- 10.6.8 The Partnership recognises that this is a measure of last resort and would only be employed in exceptional circumstances once all other options have been exhausted.