

3.5.1

Option A – the old line

Before beginning to assess potential new alignments for the canal, an assessment was made of the old alignment. While restoring the canal on the original alignment is no longer possible due to the JCB plant, it may be possible to create a diversion around this area.

Starting to the north of Denstone, the canal could follow the old railway line through Denstone using an existing bridge below Denstone Lane and College Road.



Figure 13 – Old railway line at Denstone

To the south of College Road, a building, ‘The Old Crossing’, sits on what would be the line of the canal. A gap of around 9 metres exists between this and the adjacent building ‘The Station House’. It may be possible to fit the canal through this gap in a one way 2.5 metre wide, vertical sided channel. If this subsequently proves not to be possible, it would be necessary to demolish ‘The Old Crossing’.

From here south, the line is relatively simple, skirting round the eastern side of a school playing field and below Stubwood Hollow Road. In order to pass below the road, some raising of the road would be required, with a lock constructed to the north of the road.

Continuing south, the next major obstacle is the JCB plant. It may be possible to follow a line as shown on the plan above, though this would require working on steep sidelong ground and would potentially cause some access difficulties and restrict future expansion for the operations at the JCB plant.

Continuing south from here, ground levels begin to rise and significant works would be required to return the canal to its original alignment. The assessment of this route has been ended here as it does not appear feasible beyond this point.

Constraints

There are significant constraints to the restoration of the canal along this route, chiefly very high ground levels. These would require either very deep cuttings or a series of locks to raise the canal. This would create a new top pound and much increased construction and operational costs due to the likely need for backpumps to conserve water in the system.

Given these constraints, this is not deemed to be a feasible solution.

3.5.2

Option B – through the lakes

At around grid ref 409681, 341237 some 350 metres north west of Denstone Lane, the canal would branch off to the east towards Calwich Cottage Farm. Two locks would be required to drop the canal from its original level of 92.5m down to 87.5m AOD. It should be noted that this appears to be slightly below the adjacent existing river water level.

Sufficient room exists for the canal to cross the B5032 between Calwich Cottage and the River Churnet. Works would be required to the road here in order to raise it by approximately 1 metre. An alternative option is described in 3.5.3 below. From here the canal is free to continue south, around Denstone Hall and towards the B5031.



Figure 14 – Possible crossing at B5032

At the B5031, around grid ref 410604, 340062, a new lock would be required to drop the canal to 84.5m AOD with the road needing to be raised around 1 metre. There appears to be sufficient room for the road to be raised as required.

Once past the road, the canal would enter the lake to the north east of the JCB works and would continue through for approximately 600 metres. No information is currently available on the water depth in this lake so it is possible that some dredging may be required to provide a navigable depth. There would seem to be significant scope for use of this lake as a marina, subject to the approval of owners JCB.

At the southern end of this first lake, a short 20m – 30m link and a new footbridge would be required to link in to the smaller lake to the south.

The canal would then run south west through this lake for approximately 150 metres before reaching Hollington Road. In order to pass below Hollington Road and into the lake to the south of this, a new lock would be required to drop the canal to 93.5m AOD. At the bridge crossing, Hollington Road would need to be raised by approximately 1 metre. In order to achieve this, it is suggested that the crossing would need to be approximately 80 metres from the junction between Hollington Road and the B5030.

Once past Hollington Road, the canal would pass through an area currently used as a sports ground. Further work would be required to assess the layout and use of this area to mitigate any impact the canal would have on the facilities available.

The canal would then enter the third lake, which it would run through for around 440 metres. At the southern end of this lake, the new canal would need to cross an access road, for which a new moving accommodation bridge would be required.

The canal would then cross through an area of open land at around natural ground level, before reaching the B5030.

In order to cross below the B5030, a new lock would be required to drop the canal to 81.0m AOD. At the bridge crossing, the road would need to be raised by approximately 1 metre. While this is a busy road, sufficient room exists to carry out this raising and if required, a temporary offline bypass could be constructed during the works.

Once past the B5030, the canal enters a relatively flat area with no further major constraints between here and the River Tean at the quarry site. A number of drainage ditches and streams cross the alignment of the canal and would require either diverting into, via or culverting below the canal, these will need to be undertaken with the approval of the Environment Agency and any local Internal Drainage Boards (IDB). Four accommodation bridges would be required to carry access tracks, however none of this poses a significant constraint.

At the southern end of this section, the canal would reach the River Tean and the last constraint before reaching the quarry. Here, a river crossing structure and lock would be required to drop the canal down to the notional / assumed quarry water level of around 78.0m AOD.

Constraints

The main engineering constraints to this route are the crossing at the B5030 and at the River Tean. In addition to this, significant landowner negotiations would be required to secure the route alongside JCB. Once the canal enters the flood plain of the River Churnet and the River Dove, significant work would be required on the flood risk assessment and public use risk assessment in order to obtain approval from the Environment Agency and / or local Internal Drainage Boards.

Opportunities

Two significant opportunities exist along this route:

- Use of the canal to aid surface water management and flood risk.
- Use of the lakes alongside the JCB plant as marinas

3.5.3

Option C – via Rocester

For the first 1.5 km, as far as the B5031, this would follow the same route as Option B, though an alternative option for passing Denstone Lane has been shown.

Rather than raising the road, the canal could drop down into the River Churnet, via a lock, at a level of around 88m AOD rather than the 87.5m AOD from the two locks described above under Option B. At this level, the canal could pass below the existing Denstone Bridge, before leaving the river and heading south past Denstone Hall. Subject to consents from the EA, it may be possible to canalise a longer stretch of the River Churnet thereby reducing excavation costs. However this option is likely to raise significant environmental and water quality issues.

The canal would diverge from route Option B at the B5031, at which point it would head east.

The canal would then need to cross the River Churnet. While it would be preferable to continue with a pound level of 88m AOD, this would require the construction of an embankment in the flood plain of the River Churnet, which is unlikely to be acceptable. It may therefore be necessary to lock down to around 86m AOD before locking back up to 88m AOD.

A new culvert crossing below the B5030 would then be required, though no road raising would be necessary.

Between the B5030 and Rocester, the canal would cross an area of high ground. It may not be possible to skirt around this area due to the presence of remains of a Roman fort near Ashbourne Road. A cutting up to 6 or 7 metres deep may therefore be required.

In order to pass Rocester, the canal would need to either run alongside or through the River Dove. Between the river and the adjacent properties is a minimum gap

of around 9 metres to the closest building and 3 metres to the closest garden boundary. While it should be possible for the canal to pass through a 9 metre pinch point, it is likely that part of the adjacent gardens would be required.

To the north of Mill Street is an existing football ground. A lock would be required to the north of this ground, dropping the canal to a level of around 85.5m AOD. The canal could then pass to either side of this ground, shown as options C1 and C2. Option C1 would pass the new JCB academy development but would require major works to lift Mill Road to allow the canal to pass.



Figure 15 – Area between the River Dove and football ground

Option C2 would not require any road raising, but a new culvert would be required under the existing road.

From here the canal would head south west through the flat floodplain area between the River Dove and the River Churnet via two further locks until reaching the River Churnet at a level of around 80m AOD.



Figure 16 – Flat floodplain of River Dove

A crossing structure would be required at the River Churnet and the canal would continue south east to meet with the route described above under Option B.

Constraints

The main constraints of this route are the potential archaeological complications around the Roman fort at Rocester, the river crossing and the implications of constructing in the flood plain.

In order to construct the canal, a significant amount of work would be required in order to obtain EA consent. In addition to this, frequent flooding of the canal would cause operational and maintenance difficulties for the canal operator.

Work would be required to ensure the safety of the public caught on the canal at times of flooding. This could be addressed by the inclusion of floating moorings or refuge areas to ensure boats could safely rise with the flood waters.

Opportunities

As mentioned above, JCB are in the process of constructing an engineering academy at Rocester. By passing through this area, there may be some scope for use of the construction of the canal as a training exercise. Future long term partnerships with JCB may be possible.

3.5.4

Summary

Based on the assessment above, it is concluded that both Option B and Option C are feasible routes.

Option B appears to be less complicated with fewer risks and greater opportunities and is the option that has been priced in the cost estimate.

A key risk for Option C is that a further detailed study could show that this route is not feasible on the basis of potential objection from the EA due to the interaction with the River Churnet, River Dove and the impacts on the flood plain. A further risk is that the required environmental mitigation to allow the work to be carried out would be prohibitively expensive.

3.6

Services

Along the length of the canal a number of existing services are known to be present.

Services enquiries have been sent out as part of this study but with few replies yet received. Any more detailed information will be passed on separately. The details in this section and the cost estimate are based on observations made on site and from the limited responses from suppliers received at the time of writing.

Starting from Froghall and running south, the following are present on or close to the line of the canal:

- Pipeline from Froghall to A52
- 11kV electricity cable from Oakamoor to Alton
- Sewage pipes from Oakamoor to Alton
- Gas pipe from Oakamoor to Alton

In addition to these, there are likely to be a number of different services present at each road crossing which would require diverting as necessary.

It is unlikely to be cost effective to divert all the major services between Oakamoor and Alton. It will therefore be necessary to fit the exact route of the canal alongside these services with the services diverted locally only where absolutely necessary.

The construction of a new continuous footpath through the Churnet Valley may also give the opportunity to use this path to install new fibre optic cables or other utilities in order to upgrade/improve existing facilities. The income from this may go some way towards offsetting the cost of service diversions.

A cost allowance of £7M has been included within the cost estimate in order to deal with these services.

3.7

Costs

A cost estimate has been produced based on the description above for the section from Froghall to Denstone and on Option B from Denstone to Uttoxeter Quarry. A separate estimate has been prepared for each of these sections.

The following assumptions have been made:

- Cost estimate based on unit costs derived on previous work done for B&MKW Trust by Halcrow and externally verified by professional QS and contractor. While this was based on a broad canal, at this level of confidence, it is not felt appropriate to reduce these.
- No cost has been included for land purchase or negotiations.
- A percentage allowance has been made for general preliminary items as would normally be included in the contract cost (sensitivity ranges included for best/worst case are 15% and 25%).
- Vertical sides of canal pounds have been supported using L8 trench sheeting with walings and anchor piles.
- Costs are at June 2009 prices with no allowance for increased costs.
- All material taken off site assumed to be inert (if much dredging of canal and river silts is required, while not contaminated, a significant amount of this material could be classed as non-hazardous rather than inert).
- No allowance has been made for contaminated land except where expressly stated.
- The risk cost included is as defined in section 6.

It may be possible to reduce some costs by use of volunteers.