

Wychwood Wild Garden: Report on the Restoration of the Canals

September 2014

Summary

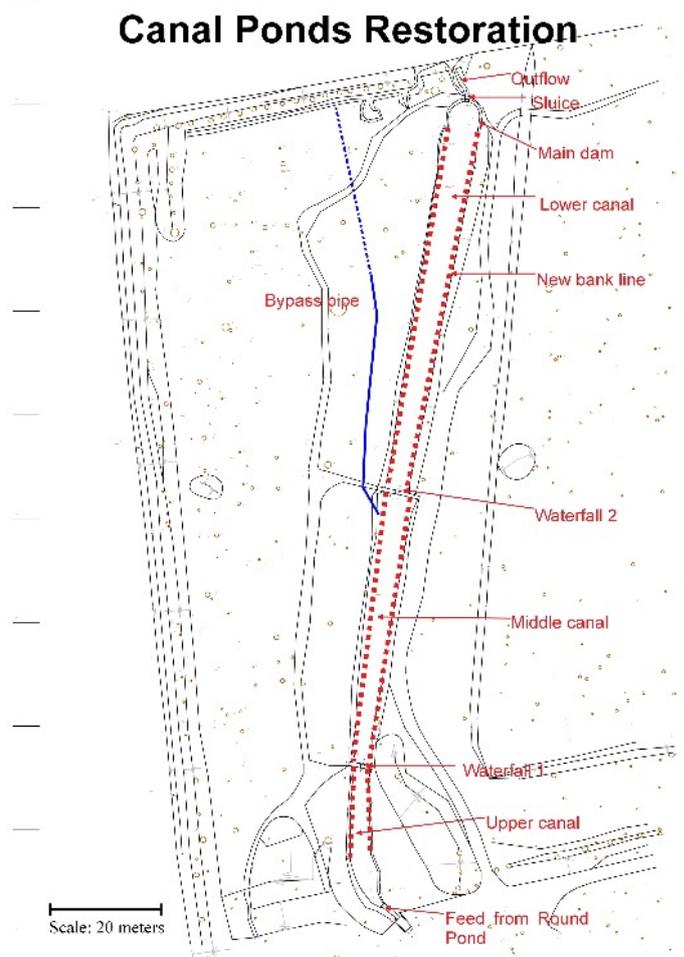
The Wild Garden was acquired by the community in 2010, with assistance from the Sustainability Fund, to provide a local environment for recreation and relaxation. The canals which were constructed between 1850 and 1880 and are an important feature of the Shipton Court Pleasure Garden were in a very poor state of repair with major leaks and significant silt build up. As a result they could no longer sustain fish and were progressively deteriorating. The project was to restore the canals to their original dimensions by repairing the main dam stonework, eliminating major leaks, redefining the banks' edges using Nicospan, which is widely used on the UK canal system, and dredging the silt, providing the necessary back fill behind the new barriers created by the Nicospan and forming the new canal banks.

Once restored the canals would, once again, not only be an attractive feature of the Wild Garden but also support fish. The completed project would also allow the reclamation of the land to the north west of the canals which is usually water logged due to the leaking canal banks.

The key activities of the restoration project were:

- Divert the water flow to allow dry working in the lower canal and pump out the dam sump. This was achieved by laying an overland pipe from the middle canal to the canal outlet, using volunteers.
- Restore the damaged stonework in the dam using local specialist stone masons.
- Clear and restore the sluice and culverts at the main dam. Add debris guards to eliminate debris obstructing the sluice and blocking the culverts.
- Install the Nicospan geotextile barrier along the lower canal and dredging years' of accumulated silt to back fill using a combination of the contractors and local volunteers.

This sequence of operations would then be repeated for the two smaller canals



The Lower Canal

The canal was in poor condition with heavy silt build up and with trees growing in the banks. There were also major leaks on the west side. The approach to the restoration was to realign the banks as close to their original as possible with Nicospan and to use the dredged silt to fill the space created behind the Nicospan barrier. This would avoid the problems of removing significant quantities of silt from the site.

The work started in April 2013 with the opening of the sluice at the bottom of the canal, probably for the first time in over 50 years. The sluice runs out through culverts which had also collapsed over the years. Once the canal had drained down, the main debris was removed from the canal and an initial dredge carried out to allow for further inspection.

The next phase was to divert the stream with a pipe from the middle canal, using a temporary overland pipe that would remain in position while the restoration work was carried out. This work was carried out in conjunction with the Cotswold Volunteers.

Stone masons then assessed and removed the damaged stonework in the dam.

At the same time the run-off culverts were excavated and new pipes installed. The area below the dam has now been filled in and a new path and bridge constructed around the bottom of the dam.

The main work of dredging the silt and reserving this to build the new banks was contracted out. The digger also removed the tree stumps growing in the banks.

The new banks are formed using a geotextile membrane called Nicospan, fixed with posts every half metre and tied back by wire to stress posts to take the weight of the silt in-fill. The silt took a few months to dry out but now allows a new and stable bank to develop.

The completed canal edges have been faced with whaling boards to add strength but which still allows vegetation to grow over the top of the boards and through the membrane to form a new natural bank.

The canal was then reflooded using temporary stop boards while the sluice was refurbished and repaired.

Further work was required over the winter fixing guards to ensure that the new culverts weren't obstructed or blocked as a result of bad weather. The repaired sluice was reinstalled and the area around the dam improved for visitors.



The lower canal before restoration



The overland bypass pipe



The excavated sluice culverts



Dredging the lower canal



Installing the Nicospan



The lower canal after restoration

The Middle Canal

This canal was very shallow as a result of accumulated silted and seriously eroded around its dam, but otherwise there were no serious issues identified. The decision was therefore taken to only partially reline the banks with Nicospan, leaving the rest dredged down to the original clay bottom. The result is a natural bank edge along the whole length of the canal, which when fully dried out will allow for vegetative growth. The existing sluice was replaced to ensure a watertight seal and the canal reflooded.

The Upper Canal

This canal was in very poor condition, with major leaks around the dam, considerable silting and debris, and both the retaining stone walls were deteriorating. A substantial amount of clay had previously been dumped around the dam which made investigations more difficult - all this clay needed to be excavated.

The canal was dredged back to the clay lining which was repuddled where necessary. A limited length of Nicospan was installed on the curves of the canal to minimise erosion. The flow over the waterfall from the Round Pond was diverted through pipes while work was undertaken. Both the retaining stone walls were taken down and rebuilt using new walling stone. The outflow from the Round Pond was repaired and a new waterfall lip cast in position.

The remaining work to be carried out, once the dredging spoil has dried out is to reinstate the path along the edge of the upper canal and to replace some of the lower dam coping stonework that has been damaged over the years.

Additional Works

As the project proceeded it became clear that additional works, not included in the original grant application, were required.

The remaining water around the lower dam proved very difficult to remove to allow the repair of the dam stonework. A sludge pump was employed but to only limited success. Eventually the lower of the two culverts was discovered and the water drained out.

The west bank of the lower canal was in poor condition and it was decided to install a PVC liner along this section to help eliminate the leaks. This was installed behind the Nicospan bank and additional clay puddled in.

The original cast iron sluice gate had been modified by the previous owner to lower the water levels. This proved impossible to repair and a new steel sluice gate was commissioned together with a debris grill.

Due to the weight of the dredged silt behind the Nicospan banks on the lower canal it was decided to also install whaling boards for extra strength.

The original application underestimated the costs of hire of a digger and driver for middle and upper canals.

The reclaimed stone from the two retaining walls in the upper canal was of very poor quality and an additional 5 tons of walling stone was required.



The upper canal before restoration



The middle canal after restoration



New stone retaining walls



The upper canal after restoration



The upper canal after restoration

Financial report

The following is a summary of the project costs compared to the estimates given in May 2013. While the costs of material were reasonably accurate, we incurred additional costs in dredging the lower canal, repairing the main sluice gate and the total digger hire days. This was compounded by bad weather during September 2013.

Item	In Kind hours est.	In kind hours act.	Original Estimate ex VAT	VAT	Actual incl VAT	Notes
100m drainage pipe and fittings			980	196	1304	Incl extra fittings
300m Nicospan			1326	265	1591	
Fixings and tie back posts			3152	630	2298	
300m membrane			780	156	132	50m only
Tying wire and nails			90	18	94	
Hire of digger, dumper and driver			1200	20	4305	Lower canal 13 days
Stonework repairs			5500	1100	7440	
Volunteer hours	300					
		790				Lower canal
		360				Middle and Upper Canal
Sub total	300	1150	13128	2385	17164	
Additional work						
Repair of sluice					729	
Hire of Sludge pump					594	
Whaling boards for lower canal					319	
Liner for lower canal bank					386	
Clay delivery for repuddling					135	
Hire of digger for path renovation					2616	
Hire of digger for middle and upper canals					2532	
Walling stone for upper canal					597	
Sub total					7908	
Canal Restoration Project Total					25072	