

Enhancing Straightened River Channels

3.4 Radical re-design from uniform, straight channel to a sinuous, multi-channel river

RIVER ALT

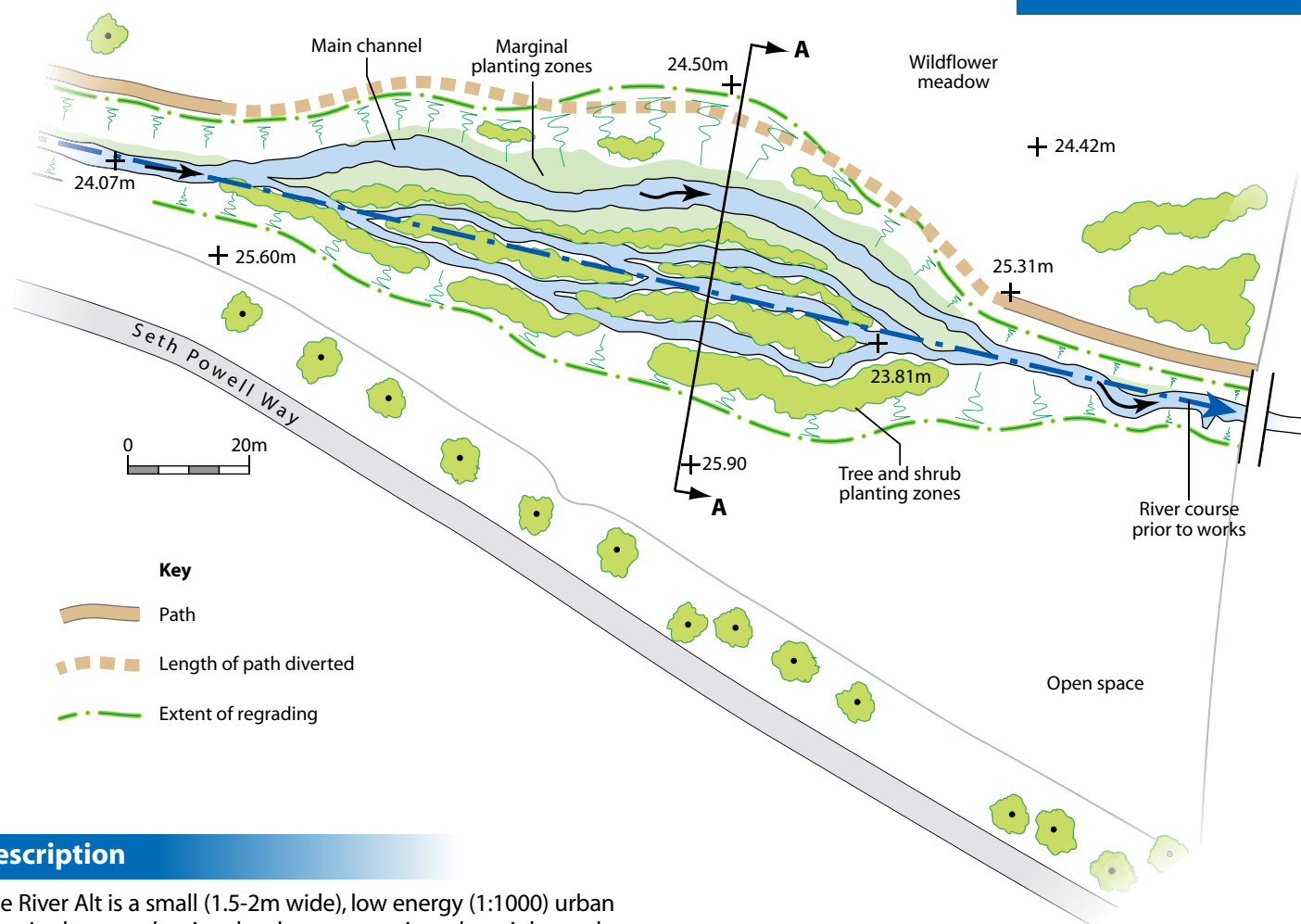
LOCATION – KNOWSLEY, LIVERPOOL, MERSEYSIDE SJ435927

DATE OF CONSTRUCTION – 1996

LENGTH – 140M

COST – £40,000

Figure 3.4.1
PLAN OF THE WIDENED
BRAIDED CHANNEL



Description

The River Alt is a small (1.5-2m wide), low energy (1:1000) urban river. In the past the river has been re-sectioned, straightened and over-deepened. The rehabilitated section runs through an area of public open space having been previously realigned to follow the road edge, close to a housing estate. Improved water quality has resulted in fish returning to some parts of the system in recent years, but further improvements in wildlife value had been limited by the poor quality of the river habitat.

Consultation with local authorities, community groups and local schools took place during the design and construction phases. Options for rehabilitation were constrained by existing planning permissions on part of the site and the existence of a wildflower meadow. The provision of public access was a very important element in the design.

The river flows beside a road and was constrained within a trapezoidal channel. Dense bankside growth often hid the small watercourse. An existing footpath on the left bank was set back from the river. A result of disposal of excavated material from the original construction of the course, the immediate bank was at a higher level than the surrounding land, effectively shielding the river from view.

As the river course moved away from the roadside, it presented the opportunity to create a wide (up to 30m) floodplain within the confines of the channel. By doing so this could open up the view of the river by removing the existing 'raised' bank.

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Trees, shrubs and marginal plant species

Trees at 2m centres	Shrubs at 1m centres	Marginals at ~ 4/m ²
White willow Ash Oak Alder Gean Bird cherry Eating apple varieties	Common osier Goat willow Hawthorn Blackthorn Hazel Dog rose Honeysuckle Dogwood Bramble	Purple loosestrife Yellow flag Water plantain Common club-rush Common reed Water mint Gypsy wort Water forget-me-not Brooklime

Trees and shrubs all 1+1 bare root transplants 0.6m–0.9m, ratio of 2:1 shrubs to trees.
Random species groups of 3–5 trees and 5–7 shrubs.



Before:
The Alt, straight
and steep sided

Bed dominated
by silt

Design

The 1.5 metre 30 degree banks were excavated back on either side of the existing course, creating up to a 30m width of 'floodplain'. This work was carried out over 140m. The 'floodplain' comprises a 'main' channel and several braided channels separated by marginal berms. In order to achieve a matrix of channels, standing water and damp areas, interspersed by trees and shrubs, ground levels needed to vary. Due to the uncertainties of ground condition and in order to work with the natural conditions as much as possible, this was supervised on-site to avoid over-specification on the design drawings, and to allow for adjustments as necessary.

Bed levels were calculated from existing levels, constrained by a bridge at both ends and an outfall half way along the scheme. Fortunately the bed level corresponded to a clay layer, making a good guide for the contractors. Working in the wet also provided a good guide to relative levels.

The existing channel was narrowed to form the deeper of the braids. The new 'main' course was about 25% larger and deeper than the braided channels to encourage the majority of low-flows along this route, and was located along the left bank, nearest to the footpath route. It was accepted that high flows would possibly alter this pattern and that such natural changes could take place due to the excess flood capacity within the new 'floodplain'.



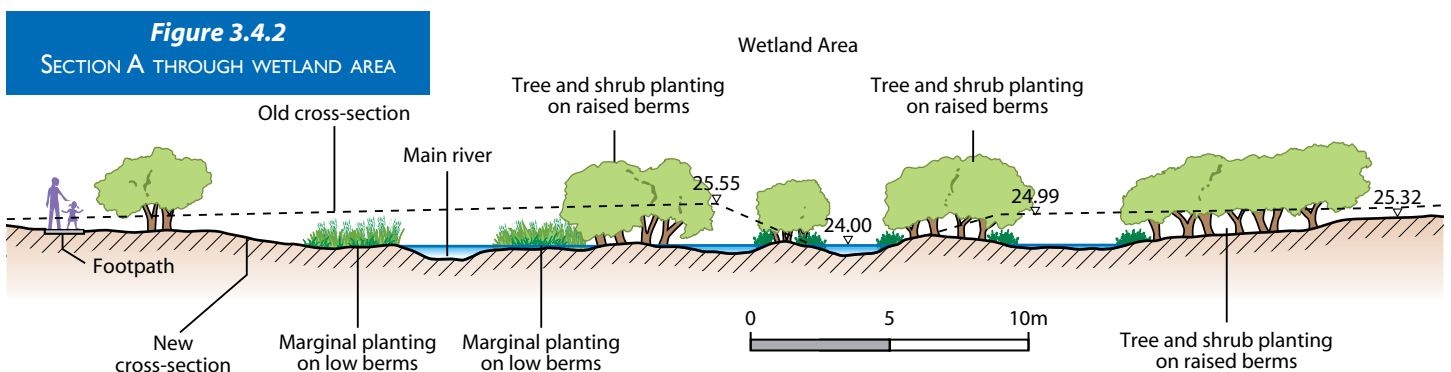


The excavated 'floodplain' area

The final bank profiles were as shallow as 1:25, connecting the low lying adjacent land by removing the existing raised edge. For a length of 50m the redirected footpath now cuts across the shallow bank slope bringing the public closer to the watercourse.

The shallow berms separating the braids and main course were planted with various riparian species rather than relying on natural recolonisation, as there was little natural seed source upstream. In addition on some of the higher berms willow was planted to provide extra cover. A native grass and wildflower mix was used for the banks.

Spoil disposal had to be addressed at an early stage to permit such a large (9000m³) 'floodplain' excavation. The nearby school planned to build an earth bank to prevent illicit vehicle access to its playing fields. By using 6000m³ from the enhancement works to help the school achieve this, the project avoided a potential doubling of costs.



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Subsequent performance 1996 – 2001

The planting has been successful, with the exception of some of the shrubs on the riverbank which were removed.

Though only indicative at this stage, on at least two occasions there has been a whole water quality class improvement between upstream and downstream on the site. Though not physically well suited to most fish, the number of sticklebacks (*Gasterosteus spp.*) has increased markedly.

Anecdotal evidence suggests that people are happy with the scheme. However, there is also evidence that some people were expecting something different.

When creating a wide, shallow and braided channel it is important to recognise the likely increase in urban rubbish deposited after flood events. If not properly managed this can seriously affect the success of the overall project, particularly from the public's viewpoint.

Original Information Provider:
Neil Guthrie



A good diverse vegetation structure has developed along and between the channel threads



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3.4 River Alt 2013 Update

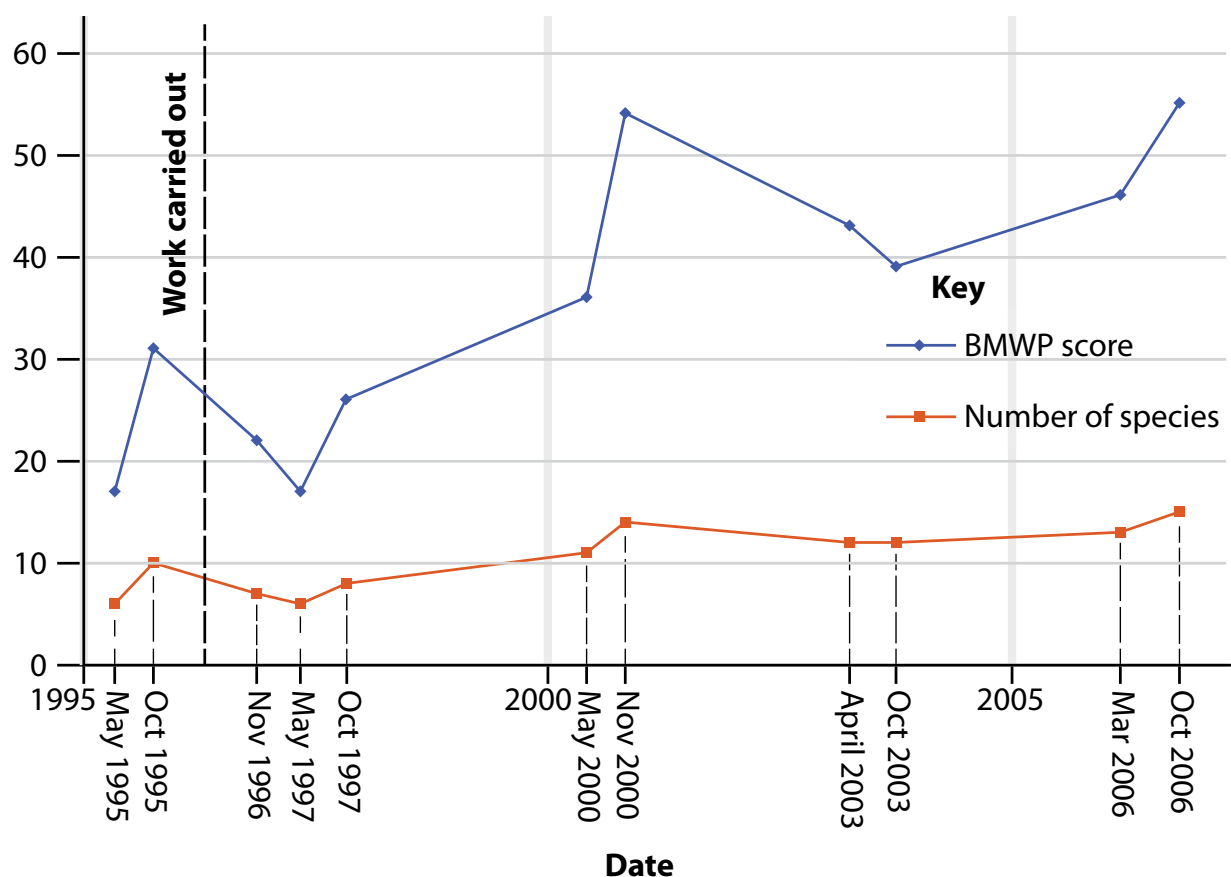
The initial earthworks have led to access and recreation improvements along this stretch of the Alt. Common reed (*Phragmites australis*) has been able to develop reinstating a locally rare habitat and increasing the biodiversity potential of the river at this location. Biodiversity within the braided section of the channel has been limited by reedbed monoculture. The encroachment of the reedbed has reduced velocities thereby increasing siltation and reducing flow variation as a result.

Minimal management has been undertaken since the project works and is limited to debris clearance at the road culvert downstream. As a result the wider area is heavily shaded by willow (*Salix spp.*) and alder (*Alnus spp.*) tree cover. Bramble (*Rubus fruticosus*) is also dominant over much of the site. In 2012 Knowsley Metropolitan Borough Council (MBC) carried out improvement works on the riparian corridor and re-opened the choked braided side channels as part of the 'Knowsley 2020' project. Tree works on the over steepened banks immediately upstream of the site were also undertaken. The council has been advised not to plant further willow and alder trees but

River Alt	Low energy, clay
WFD Mitigation measure	
Waterbody ID	GB112069060580
Designation	None
Project specific monitoring	Macroinvertebrate

to use oak (*Quercus spp.*), hawthorn (*Crataegus spp.*) and hazel (*Corylus spp.*) as they are not likely to encroach as far into the reedbed.

The visual appeal of the site and the visibility of the River Alt as a feature at this location has been improved through the scheme. Knowsley MBC is undertaking further work to open up access to the riparian corridor and is currently installing a cycle way. Local residents were consulted through the North Huyton Neighbourhood Network for the 2012 works.



Changes to overall number and diversity of invertebrates at the downstream end of the site between 1995 and 2006.

(Stock Bridge Site, SJ 43210 92717. EA data)

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Water quality and invertebrate sampling was undertaken between 1994 and 2006 and indicates that there has been an overall improvement in the number and diversity of macroinvertebrates at the site. Further to the improvements in water quality, noted in 2001, the Biological Monitoring Working Party (BMWP) scores shown below indicate that water quality downstream of the site has improved following the works. The BMWP uses invertebrates as biological indicators of water quality. A high BMWP score is indicative of cleaner water.

The technique used on the River Alt has been a catalyst to encourage similar thinking in the region. The site would have benefited from a tailored long term management plan.



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One of the choked braided side channels – March 2012

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