

Terminal 5 Twin Rivers Diversion

critical sub-project in airport's T5 expansion programme

by

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The diversion of the Twin Rivers from their original alignment through the middle of the Terminal 5 development site to around the Western perimeter of Heathrow Airport represented a huge challenge. These works were a critical sub-project on the T5 programme so far as until they had been completed the original rivers could not be demolished to facilitate the continuation of the main terminal development. This £45M sub-project included the creation of two, 3km long river channels, the phased realignment of the 3km Western Perimeter Road (WPR), (including construction of a 130m long, 6m high arch, which grade separates the WPR from the new T5-M25 motorway spur) and landscape works to the western boundary of Heathrow.



Heathrow Airport: Diverted rivers and A3044

photo courtesy of BAA

Key to the success of this sub-project was the way in which the project team worked in partnership with the key stakeholders, the Environment Agency, the Royal Parks Agency and the London Borough of Hillingdon (LBH). By working in this way the team created an integrated river, road and landscape corridor that not only enhances the ecological value of the rivers and the western perimeter of the airport but, by keeping the WPR open throughout, has ensured no significant impact on Heathrow Airport and the local communities.

The project was delivered via an integrated sub-project team including BAA, Laing O'Rourke, Kellogg, Brown and Root, Tarmac Property Services and EC Harris who were specifically responsible for cost, commercial, risk and change management. The construction works spanned two winters and one summer and was completed within budget and three weeks ahead of schedule.

The works

The Duke of Northumberland's River and Longford River were constructed in the 16th and 17th Centuries for the purpose of water supply from the River Colne to the royal residences at Syon House and Hampton Court Palace respectively. Before the sub-project commenced the Twin Rivers ran beneath the runways and across a sludge treatment works at the western end of Heathrow Airport.

This sub-project was under constant pressure to progress since the end of the T5 Public Inquiry in November 2001. Detailed planning approval was granted by LBH in July 2002 and detailed design was undertaken between May 2002 and December 2002. Works began on site in December 2002 and were completed in April 2004 when the old, decommissioned rivers were handed over to another T5 sub-project for demolition.

Water Treatment and Supply

The overriding challenge during design and construction has been to balance the requirements of rivers, roads, and landscape in a very narrow corridor bonded by the A3044 to the West and the Heathrow runways and the main T5 development to the East. In order to meet the challenge the integrated team embraced the T5 Agreement (bespoke T5 Partnering Contract) and exemplified teamwork in extensively value engineering the solution and managing risks and opportunities to deliver the sub-project below the incentivised target cost.

For the rivers it has been necessary to not only satisfy the hydraulic requirements but also to maximise their environmental value. To achieve this, as much as 95% of the diverted rivers has been placed in open channel, compared with only 50% for the original rivers which were conveyed beneath the runways in tunnels. As much as possible of the new channels are formed by naturalised, trapezoidal banks with vertical concrete walls defining the channels where space is limited. To facilitate the speed of construction and minimise the environmental impact of the works 75% of the river walls, over 5km, were pre-cast off-site.

Pre-planted coir rolls and hazel hurdles woven on site provide habitat for small mammals along the naturalised banks. In-channel enhancements maximise the ecological value of the vertical sided channels and were placed so as to create a meandering flow pattern further enhancing the river bio-diversity. Recycled willow trees provide habitat for fisheries and macro-invertebrates, whilst gravel

enhancements provide the infrastructure for over 84,000 native river plants.

A programme of translocating water voles, plants, fish, freshwater mussels and riverbed silts from the original rivers further maximised the ecological value of the new channels.

The diverted rivers were constructed over the old WPR, a busy airport road requiring its realignment eastwards towards the airport. The road was re-aligned in 6 permanent and 2 temporary phases and was kept open to traffic throughout. The construction team peaked at 400 members, working closely to ensure a safe environment in a very constrained site between two live roads. Other restrictions in this unique working environment included limitations placed on the use of cranes due to landing aircraft.

A massive commitment to landscape has been made within the western corridor of the airport. As well as supplementing the rivers and roads, the landscape provides a transition between the Colne Valley to the west of the airport and T5. This has been achieved by planting over 450 semi-mature trees, 2,000 semi-mature native shrubs and 100,000 evergreen ground cover shrubs. ■

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