

# ODA Sewer and Pumping Station

**Client:** Olympic Delivery Authority

**Location:** Stratford, London

**Value:** £21m

**Duration:** 22 Months

## In brief...

Delivering an iconic pumping station as part of the Olympic development site.

Barhale was awarded a £21 million contract by the ODA to design and construct a primary foul sewer and pumping station as part of the Olympic Park development.

The Primary Foul Drainage is a park wide utility which collects, conveys and discharges flows from the main venues, buildings and residential developments during the Olympic, Transformation and Legacy Modes.

The system receives flows from the secondary foul drainage system and conveys flows by gravity to a terminal pumping station which discharges to the Thames Water Northern Outfall Sewer.

This highly complex, multi-disciplinary scheme included the construction of 2km of deep sewer in tunnel, 13 No. shafts ranging in size from 4.5m to 12.5m diameter and a large pumping station which formed the centre-piece of the contract.

## Customer benefits:

- Successful delivery - project delivered to tight programme and budget constraints
- Award Winning - The Pumping Station was declared 'Service Building of the Year' at the New London Architecture award ceremony
- Huw Preece was awarded with Operative of the Year for the entire Olympic Park at an awards ceremony in 2009
- Value engineering to reduce outturn costs - For example, reducing the shaft construction by extending tunnel drives and reducing the cover on the top of the tunnels adjacent to railway lines. This resulted in total savings to the ODA of £1.5m
- Effective stakeholder management that minimised disruption within the park
- Innovation in health and safety - project delivered with zero incidents
- Sustainable delivery - The project achieved a CEEQUAL rating of Excellent



Delivering the centre piece of the contract - an iconic pumping station as part of the Olympic development site.



Concrete panels feature Sir Joseph Bazalgette's designs of London's first sewer network, built in the 19th century



Highly effective Interface and Stakeholder Management - The scheme was spread over 13 shaft sites and was subject to numerous constraints and interfaces. Barhale worked closely with the client and other stakeholders such as LUL and Thames Water to ensure interfaces were carefully managed. Key to this success was employing a full time Logistics Coordinator.

Benefits of this approach were:

- All stakeholders were well informed ensuring a 'no surprises' approach
- Barhale changed sequence of works to accommodate the Olympic Park Construction programme. This prevented major delays to the Southern Loop Road construction.
- Effective working alongside contractors on Network Rail Infrastructure

Award winning design - Barhale along with design partners Hyder Consulting, Donaldson Associates and John Lyall secured 'Service Building of the Year' at the New London Architecture Award ceremony for the iconic Pumping Station.

Innovation in Health and Safety -

Health and safety is Barhale's first priority and the ODA team developed a number of innovations as follows:

- Segment Storage Frames and Retaining Bars - an innovative solution for the safe storing of concrete segments which involved the design, build and testing of the frames using in house fabrication
- Effective monitoring of hand arm vibration - Promoting the use of the HAVmeter from Reactec for HAVS monitoring
- Introduction of the Barhale Pole Grab Standard - introduced following failure of bolt connections on a Leibherr Grab Machine whilst excavating at a shaft location on the project.

Sustainable Design and Construction -

The project received a CEEQUAL rating of

'Excellent' and achieved an Outstanding Achievement Award at the 2011 CEEQUAL Awards. The works also received a Silver Award at the 2010 Considerate Constructor Awards. Sustainable elements of the pumping station design included:

- Physical modelling to design lowest whole-life-cost for the pumps
- Low energy lighting and heating
- A Living Green roof to enhance ecological value and biodiversity by attracting local wildlife
- Boxes for bats, black redstart and house sparrows.
- External landscaping designed for surface water run-off

Value Engineering to reduce out turn costs:

- Instigated a 24hr tunnelling operation to enable following on contractor to commence their works ahead of Olympic Park programme.
- Increased shaft construction to enable the introduction of a third tunnel boring machine to deliver additional scope.

- The contract scope was extended to connect the velodrome onto the system. This included an additional 4 No. shafts and 300m of 600mm diameter tunnels within the original programme duration.
- Structural design of pumping station was changed to include the shaft jacking collar as an integrated element of the structural floor slab of the station.
- Early engagement with CTRL and Great Western Railway enabled a reduced cover of 1.5m over the top of the tunnels to be adopted.
- On the Northern Sewer Outfall, Barhale worked with Thames Water proving design settlements under the major sewers so that settlement monitoring equipment was not required creating a programme and budget saving.
- Reducing shaft construction by extending tunnel drives, creating further budget and programme savings.



### Technical features..

- Extensive site dewatering
- Deep excavation, Piling and Caisson sinking
- 13 No Shafts to 12.5m diameter
- 2km of Tunnelling to 10m including tunnelling under railway
- Interconnecting adits 2m x 2m
- Break outs into Lambeth Group
- Soft ground stabilisation, tunnel monitoring
- Building construction, M&E and ICA installation and commissioning
- Odour control equipment