

Abbey Wood Station Civils and Drainage Works

Client: Balfour Beatty

Location: Abbey Wood, South London

Value: £2.64m

Duration: 1 Year

In Brief...

The opening of the new train station building at Abbey Wood was an important milestone for The Crossrail Project as it was a step closer to the introduction of the Elizabeth line services. Abbey Wood is one of ten new Elizabeth line stations, providing passengers with a direct link through central London to new destinations.

As part of the Abbey Wood project, Barhale were required to undertake a series of phased drainage, utility and highway works at the newly constructed Crossrail Station (involving working alongside live rail lines) and within the surrounding streets due to requirements for public footpaths and access to the innovative station building.

A number of drainage runs and manholes were required to be constructed on both sides of the new station to serve the station connecting to the existing surface water and sewer drainage system. In addition, a new car park was required on the south side of the station with additional drainage and underground ducting to serve street lighting and communications. This was a replacement of the existing station car park following the demolition of the interim station. These works required various highways and drainage modifications to satellite locations along the newly constructed Crossrail railway track as part of the original scope.



Full-depth carriageway construction with barriers, bollards and lighting

Challenges and Changes to Scope...

Barhale were faced with a number of additions and unforeseen changes to the original scope that affected both the cost and duration of the project. One example of this was that a sewer pipe was encountered running through a surface water manhole at Abbey Terrace. This meant that uncontaminated water (surface water) was being contaminated by foul water (sewer pipe). Therefore, in this instance a Technical Query was raised resulting in the whole drainage system being re-designed and approved by Thames Water.



Construction occurring on both sides of the new station to serve the innovative building

Solutions...

In response to the redesign of the drainage system, Barhale enhanced the Station's South Car Park with a full depth carriageway construction. The benefit to our client was that they were able to let the works as one package and Barhale managed the whole process. This saved the client time and strategic use of resources. Enhancement of the Station's south car park included additional lighting, barriers and bollards.

These adaptations in scope lead the original value of the contract to increase from £694,000 to £2.64m and a timescale increase from 3 months to 1 year. The significant change both in time and monetary value of the project was brought about due to the following factors:

- The redesign of the drainage system took just over 12 weeks (including Thames Water approval)
- Adverse weather conditions (snow and ice). Part of this delay was due to vehicles, be that deliveries or site vehicles unable to safely navigate to and around site because of icy ground. Although, the conditions did not completely halt construction, they did have a delay due to ensuring site was made safe through de-icing, salting/gritting ground etc
- An ever evolving scope for Barhale. Positive responses to the quality and competence of Barhale's work resulted in the company being awarded more and more work by Balfour Beatty

The Barhale team demonstrated excellent adaptability to successfully facilitate these changes whilst mitigating the costs incurred. With this being such a high profile project in the public eye, meeting the deadline was vital for all shareholders working on this flagship station. This was achieved through the on-site team demonstrating a willingness and flexibility to accelerate the programme by implementing 24 hour working including Friday nights and Saturday mornings.

As an effect of the changing requirements and reactive measures, Barhale allocated a fulltime Quantity Surveyor to the scheme in order to meet the Station's Service Level Agreements with the public.

Customer Benefits...

- The successful delivery of a wide range of drainage and utility works. Ensuring that utilities are supplied successfully to such developments is vitally important, not just for the completed development, but also for the construction process itself. It has been cited as the most common cause of delay in construction projects, particularly on projects such as Abbey Wood where multiple connections were required
- Barhale utilised existing relationships and knowledge of dealing with utility companies including permits and licenses (i.e. TWOSA). This meant that discussions started as soon as they could with a single point of contact. Resulting in early exchange of information and confirmation of feasibility and ability to supply. Existing relationships lead to better communication of dates, procedures for access, locations etc. Existing knowledge of dealing with utilities meant Barhale could provide access, ensuring the appropriate personnel were available during surveys and installation
- Barhale's capacity to adapt and mobilise specialist trained operatives in short time frames provided benefits to the Client including shorter programme alterations and lower cost (due to achieving deadline and meeting anticipated programme times)
- This kind of project exemplifies Barhale's ability for working in customer interfacing environments as works were carried out around the interim station which was still being used by the public. In addition to working alongside live rail lines, drainage modifications were carried out on satellite locations along the above ground Crossrail railway track. In both regards, the team ensured health and safety was of paramount importance to all stakeholders concerned
- There were no accidents, environmental issues or lost time incidents on this scheme
- Barhale were issued with a letter of commendation from the Project Director for assisting local residents by clearing the public footpath of heavy snow fall
- Constantly undertook Tier 1 Recycling; Barhale and Balfour Beatty operatives reused one another's drainage materials and aggregates wherever possible
- Barhale and Balfour Beatty maintained excellent communications throughout the project. Offices were shared on site, meaning project goals were always discussed, tasks and objectives made clear, and performance constantly measured and reviewed



Full 10m x 200m car park construction leading to pedestrian walk ways for entry/exit to the main station building



Surface and sewer drainage including an oil separator

Technical Features...

Barhale constructed a fully bitumen surfaced 200m squared car park from formation level, including all sub-grade works and finishing within of the car park, Barhale installed 12 Pulling Chambers storing cables and cable joint boxes used for connection to fibre optics, BT cables, street lighting and CCTV cameras which all service the station.

Barhale were responsible for all drainage solutions on site. Works were carried out between the existing Valve Chamber and newly constructed (by others) Attenuation Tank (5m diameter and 7m depth). The tank was located in the station's south car park and was installed to control flooding if the drainage system on site was overwhelmed before getting to the outlet. These works required careful planning and sequencing as other contractors on site were working in close proximity or in the same areas. One solution Barhale had to this problem was to install a scaffold tower with removable edge protection so that operatives could gain access to the Attenuation Tank whilst works still took place uninterrupted on the car park below.

Pipe connections were made from the pumping station inlet (housed within the Attenuation Tank) to the Valve Chamber, including a 900mm extension to the existing rising main taking away water from the Valve Chamber towards the outlet. A total of 450m of drainage pipeline was installed (excavated, laid and backfilled) by directly employed Barhale operatives, ranging from 100 to 450mm in diameter.

In addition to this, Barhale excavated and constructed a total of 25 manholes. This provided various access points to the drainage network which allows underground pipes to be inspected, surveyed, unblocked, cleaned or repaired as well as directional change in flows. The depths of the manholes ranged from 1.2m to 3m consisting of:

- 22no of 1200mm diameter
- 2no of 1350mm diameter
- 1no of 1500mm diameter