

Project: Bermondsey CCU Replacements
Location: Bermondsey Underground Station
Client: Transport for London
Date: Nov. 2019 - July 2020



Introduction

London Underground identified a number of Jubilee Line stations in which the existing Edenaire HVAC units were beyond economical repair. We were awarded the contract to replace these units with new Airedale models, improving the reliability and sustainability of the station's critical assets

Project Deliverables

Our mechanical engineering team at Bermondsey replaced HVAC units across nine critical equipment rooms within the station. Working within these rooms required our engineers to hold London Underground's QAF (Equipment Room Awareness) certification.

The team initially obtained water samples for analysis, which determined the flushing and filtration requirements. They then stripped-out and retained the existing Edenaire unit components (e.g. fan decks and compressors) to service other HVAC systems across the LU network. 13 of these units were then replaced with the new Airedale models, along with associated electrical works, isolators, valves, trunking, drains and pumps.

The two units within the redundant ticket office were no longer required. These were removed by our engineers, and pipework was safely disconnected from the circuit to avoid future maintenance issues

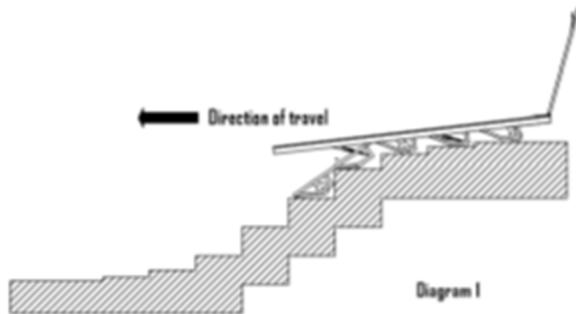
Challenges and Solutions

The first technical challenge faced by our engineers was the installation of HVAC units with a new design and specification. This required ongoing collaboration with the manufacturer Airedale. We secured a visit to the Airedale factory in Yorkshire, gaining valuable insights which influenced our logistical approach and installation methodology.

Another challenge lay in safely navigating the large and heavy plant through the confines of the sub-station, which lies 14m below ground level. We partnered with our strategic logistics partner Radius, which provided a range of innovative plant-handling equipment including Long Sack Barrows and Escalator Sledges. The Escalator Sledge (see diagram 1, right) enables a load of up to 450kg to be secured to a flat platform, and moved safely down an escalator with the weight evenly distributed across five step levels.

The Long Sack Barrow is a highly maneuverable handling tool, which allowed the units to be safely transferred from kerbside, and through the tight corners and doorways of the sub-station.

By working with Radius, we were able to pre-assemble 11 of the new units under controlled off-site conditions, and safely bring these to their final location



Radius Escalator Sledge, as used on the Bermondsey CCU Replacement Project

This enabled optimal quality assurance, while mitigating safety and programme risks associated with manual handling and on-site assembly.

Another key challenge was the emergence of the Covid-19 outbreak at a critical stage of the programme; when the Edenaire units had been removed, but before the Airedale units had been installed. The Bermondsey CCU Replacements provided vital cooling within critical equipment rooms, and were thus deemed essential works by TfL. This meant that our engineering team continued with the works through the government-mandated lockdown.

We engaged our highly-experienced health and safety team, who worked with our engineers to refine our methodology and sequencing in light of the evolving public health guidance. We established one-way systems within the sub-station where possible to minimise interactions within doorways etc. We nominated 'Covid Marshals' who were tasked with ensuring that social distancing and other preventative measures were adhered to at all times on site. Covid Marshals also implemented mandatory temperature checks on all internal and sub-contractor staff coming to site, and distributed FFP3 masks and hand sanitisers to mitigate the risk of transmission. We also procured bespoke high-visibility jackets, printed with social-distancing warnings, to remind all site staff of our new working procedure

Final Outcome and Lessons Learnt

We navigated the many challenges of this project, handing over the assets (see picture, right) and MAID requirements to the client's satisfaction. Since we began work at Bermondsey, LU have awarded our performance with additional CCU replacement contracts at Canary Wharf and Euston Underground stations. We are bringing a number of lessons learned to the new CCU contracts, including:

- Our optimised method for removal of the existing units using specialist tools. We developed this approach during the Bermondsey works, and will apply this approach from the beginning of similar future projects.
- Early engagement of partners Reigate Environmental, to allow adequate flushing of the system and refinements to the flow rate.
- Challenging the client scope, where necessary, to secure the required long-lead items and extend the life span of the new units.