

# PAS128: Blackwall Reach

## The full monty

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**D**ESIGNING and building a complex city centre brownfield project is fraught with challenges, one of which is the location of existing underground infrastructure and its impact on the future development. Utility diversions can be costly and complex. Damaging existing utility infrastructure during the construction phase is also disruptive and expensive with huge health and safety implications.

Swan Housing Group, in partnership with London Borough of Tower Hamlets and the Greater London Authority, is redeveloping Blackwall Reach in East London. The site is a mixture of commercial uses and existing social housing, which requires full redevelopment and regeneration. With a total project value of £300m and consisting of 1,575 new homes, together with Swan's regional housing office, a multi-purpose community facility, shops and cafés, and a replacement mosque, the proposed project has won praise for its wide ranging and ambitious redevelopment.

Swan Housing's consulting engineers, Hoare Lea, required a thorough process to assess and map the heavily congested project parameter of underground utilities and infrastructure. Aware of the PAS128:2014 specification for underground utility detection, verification and location and its robust process, Hoare Lea awarded Subscan Technology the tender to carry out four main phases:

- Survey type D: Desktop utility records search and analysis.
- Survey type C: Site reconnaissance.
- Survey type B: Detection of utilities by multiple geophysical methods.
- Survey type A: Verification of utility positions by strategic excavations.

### Obtaining existing utility records

Subscan's record department contacted over 30 utility providers, including London Underground, to obtain as much utility record data as possible for the PAS128 type D survey section of the contract. The information was collated, reviewed and

examined by both Hoare Lea and Subscan and transferred to a single CAD file.

### Identifying physical site features

Both Hoare Lea and Subscan project managers then visited the site to conduct survey type C site reconnaissance. The visit to the site allowed both parties to identify physical site features in relation to the utility record information.

### Detection and mapping with a difference

The most beneficial element of PAS128 is the further breakdown of survey type B. It is not simply a utility detection and mapping survey. A sub-section named 'methodology' provides clients with a complete understanding of what technologies can be used and to what accuracy tolerances.

On this occasion, Hoare Lea opted for methodology 4. Subscan used multiple ground penetrating radar (GPR) and electromagnetic survey instrumentation. It was a far from straightforward task, involving many night shifts with full traffic management support and confined space entry to manhole chambers and thorough post-processing of survey data to create a CAD model with chamber asset sheets, plus CCTV drainage condition data with reports. The final survey deliverables were reviewed with the client on several occasions so that the complex nature of the survey data could be fully understood and assessed.

The outcome of the post survey debrief highlighted several underground utilities, including high and low voltage electric cables, telecoms and water and gas pipes. These utilities were a significant risk to the project design in terms of future utility diversions and clashes with the proposed development. In most cases, the exact alignment of underground utilities, both horizontal and vertical positioning, was paramount to allow the project to continue.

### Utility verification by excavation

The post survey debrief highlighted the need for a type A verification by excavation

**Procuring an entire PAS128 utility survey and using it as a risk management tool**



The excavations at Blackwall Reach used a combination of slit trenches and spot excavations to verify critical utility locations using PAS128 survey type A.

survey. Subscan used this to quality check the findings of the type B survey and to verify utility positions to a fine tolerance.

Methods for verification can vary depending on the critical point in question. The excavations at Blackwall Reach were a combination of slit trenches, up to 15m in length and spot excavations. In accordance with PAS128, each excavation was surveyed, photographed, collated with cross sectional detail and then reinstated to local authority highway standards over a number of day and night shifts.

### A reliable utility survey

Using the PAS128 process from survey types D to A enabled Swan Housing and Hoare Lea to make detailed design decisions very early on in the project process. These decisions influenced the design and build to avoid utility clashes and unforeseen utility diversions.

Phase one of Blackwall Reach is now complete and the other phases are well into design and build. The use of the PAS128 process to assess and verify underground infrastructure has had a positive outcome in all levels of the design and build and allowed tight deadlines to be achieved.

Blackwall Reach was the first Subscan project to incorporate all PAS128 survey types, and it proved what a robust process the specification has established for our industry. Throughout the entire process, we consulted with Hoare Lea which in turn created a trustworthy and transparent client/practitioner relationship. If we look back to the very first industry meeting with BSI, achieving this level of trust was the consensus goal. To see this achieved in practice is very rewarding and proves that there is a bright future for the utility detection and mapping industry.

### PAS128 surveys are cost saving

So, how much did Swan Housing save on this project by avoiding utility strikes? We cannot say for certain, however if you ask how much utility strikes really cost, then

**PAS128 is a risk management tool in the context of utility infrastructure; the more effort and processes applied by a robust specified formula equals less risk of unmapped and unknown underground utilities.**

the University of Birmingham has quantified the value through an independent research study.

The university looked at 16 projects where utility strikes had occurred and the reasons why they happened in detail. In almost all instances the major causes of utility damage were noted as lack of utility surveys, inaccurate utility record data and lack of forward planning when working near suspected underground utilities. The cost of each utility strike was approximately £1,000.

The next step was to take into consideration downtime, redesigns, project delays, health and safety reviews, plus other social and economic factors associated with a utility strike. The overall outcome concluded that a £1,000 utility strike is actually multiplied by a factor of 29, upping the complete cost of each utility strike to £29,000. The startling ratio highlights how savvy Hoare Lea was to invest in PAS128 and obtain reliable utility data early on in the design cycle.

### PAS128 proves to be a sound investment

Hoare Lea was our first client to procure an entire PAS128 utility survey, however we are pleased to see that the specification is becoming commonplace in tenders. We continue to urge clients to fully appreciate and understand PAS128 and its requirements.

We suggest engaging with utility mapping survey providers to establish a collaborative relationship so that everyone involved appreciates a full understanding of what is offered and what is achievable.

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John Robinson is a member of the PAS128 drafting panel and a steering group member on PAS256.



Populated utility area.