

Your Project Ref Code:
Our Ref: 4054 / JL / AB / 07



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10 July 2007

Dear Alan

**Utility Detection & Mapping
Survey Investigation (Edinburgh Tram Line1)
Additional site checks
Close Out Report**

We write with regard to the above.

Client Expectations

Firstly we need to address the issue of client expectations. We were in contact with PB, Halcrow and other consultants for up to two years prior to being awarded this contract. During this time we did several presentations to all parties including the client *tie*. The core of our presentation was to emphasise that we do not claim to any client that we will find all buried services on their sites. Our experience is that we operate in the high 90%'s for completeness and accuracy but in particular sites this percentage alters. We cannot reach 100% due to the inherent limitations of the equipment that we use.

We use PipeHawk II GPR equipment that last year in independent trials in the US was commended for its accuracy. But there are places where it cannot operate; for instance in clay soils or wet ground its results are compromised and like all other GPR equipment the antenna cannot get to within 500mm of the kerb when used on the road surface. Conversely, RD equipment actually works better in wet ground but there are certain circumstances where it cannot be relied upon. For instance, Radio Detection inform users on their courses for the RD4000 equipment that we use, that a balanced H.V. cable will not emit a 50hz frequency signal that is detectable to any Radio Frequency locator set to *passive* mode and that in the *radio* mode the signal would not be detectable either. The importance of this is that we use these two modes for the radio frequency sweeps that we undertake. We spend over £100,000 on equipping our mobile offices with up to date equipment – but it all has its limitations.

So, for these reasons we issue our results with the following caveat:

“We have endeavored to supply you with the most accurate data possible by using methods and equipment that are at the forefront of our industry. We have taken great care in the detection of the pipework and buried features, but, as with all methods of detecting underground or buried utilities, the information provided, is based on results obtained from electronic and radar scans and as such, may be liable to distortion or errors beyond the reasonable control of the operator or his instruments. A correction factor has been applied where this is evident but no responsibility can be accepted for errors, omissions or incorrect data.”



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This Incident

Further to the physical trial hole being excavated on area 31 and the missed located services that were exposed, Adien were asked to complete cross-checks at another 4 separate survey areas. Those 4 areas were areas 2, 10A, 18 and 24.

Our interim close out report on those checks was issued on the 2nd May 2007 to Simon McCarroll of Halcrow. It concluded that all 4 areas that were cross-checked appeared to have been completed to our normal practices, accuracies and procedures and that no amended drawings were required to be issued.

At a meeting with Halcrow, PB and **tie** on 1st May 2007 it was agreed that the client would select four additional site locations for Adien to re-visit to provide confidence in the original Adien survey results. You subsequently asked us to undertake further “handbag sweeps” at areas 9, 11, 14 & 15 and Adien attended these four sites during the week commencing 4th June. The client was aware of our revisit schedule and we were informed that visitors from Halcrow, PB and **tie** would be visiting the sites with our team; however no one attended site when the Adien team conducted fresh RF sweeps of these four areas to cross-check against the original findings.

Again, the sweeps did not indicate any deviations from our normal practices, accuracies and procedures. Subsequently no amendments were required to the original survey results and again no additional drawings were required to be issued.

Our original report on Area 31 concluded that the missed located services within the Casino footpath of Area 31 were caused by our team having restricted access to that area which was within a Heras fenced area.

We fully appreciated the need to rebuild confidence with the client in our survey results and have undertaken all of the re-visits as swiftly as we could, once we were aware of the areas to check. We have undertaken all of these checks at our own cost and trust the client understands the value to which we entrust our service reputation.

100% validation of utilities is possible

To assist clients who want to know with 100% certainty where a utility is located, Adien have now launched a “pot-holing” vacuum excavation service which can expose buried services to validate survey records, without the need to “put a man in a hole”.

This service is known as a Level A survey and is at the top of a risk reduction pyramid which starts with Level D which is a desk-top study of utility records. Level C is a topographic survey to verify as far as possible from physical features on site, the desk-top study. The Level B survey is what we commissioned to undertake for **tie** (although the areas for level B surveys should be decided from a review of the Level C results and the client’s consideration of the mitigation of risk rather than budgetary constraints) and Level A builds on Level B results in eliminating uncertainty and risk.

As well as providing 100% confirmation, our Level A service also provides a safer excavation option to conventional trial hole digging as the methods we use cannot break an un-ducted BT two pair.

I hope that this satisfies your requirements and provides an adequate summary of the work we have undertaken on behalf of the client.

Yours sincerely,

James Lewis
Project Development Manager



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