

Captain SUBR:IM and his new home!
A Brownfield Odyssey

Contaminated Land – What's New?

This was the title of a talk I was asked to give in 1993 at a brownfield seminar organised by Edinburgh Council. I have to say that I could have done with SUBR:IM then! A presentation on our research consortium would have filled a 30 minute slot quite easily, and still not got beyond Project A! Instead the presentation covered the use of clean up technologies and remedial measures. Probably most of those technologies covered, even at that time, were not particularly new, but most have been used since with increasing frequency. Soil washing, bioremediation and active containment have been used effectively on contaminated sites in the UK.

The presentation also covered research we (BRE) were undertaking on the risks associated with building on contaminated land. These risks included chemical deterioration of foundations, unstable fill and landfill gas explosion. No mention of quality in those days!

The audience contained a healthy range of sceptics (otherwise known as civil engineers, architects, surveyors and consultants). The questions were however not too taxing or insightful, but did query why we should build on contaminated land. Yes indeed, let's avoid the risk or remove it by not building on these sites; let's build on the greenfields!. If we have to let's clean them up to the 'nth' degree. Well how do we do this, by removing the contaminated soil?

A more recent presentation I sat through last month was by someone nearer to the sharp end than me. The presenter recommended that it wasn't worth consultants loosing sleep over their brownfield work as the risks were really quite small. Probably a statistically valid observation, so keep sleeping well. What then of the residents of Invergordon, their homes built on a former gas works. Concerns over indoor air quality and health have resulted in Highland Council taking action to monitor the situation. Ultimately something will need to be done.

Whilst we can't prejudge the outcome of the scientific studies on this site we do know that to dig and dump our way to a solution would involve about 1000 trips by 40 tonne trucks from the North of Scotland to Teesside. This is not economically

feasible. Now the landfill directive is forcing us to think differently about the remediation. Will the consultants still continue to sleep as well?

Brownfield site development is continuing and will continue, further mistakes will be made and the option of dig and dump to a solution is disappearing due to increasing cost. Edinburgh's new developments are over 85% on brownfield sites and the precious green sites are now avoided if at all possible. The Highlands has more green space but can't allow unsustainable growth around the major towns of the area. It is therefore inevitable that our homes, offices, factories, laboratories, shops and recreation buildings will be built on 'problem' sites, we will increasingly have to leave the problems in the ground and/or bite the bullet on clean up technologies.

Enter Captain SUBR:IM

All this at a time when Captain (or is that Professor) SUBR:IM is planning a move from his (hers or its) ivory tower to the brown (killing) fields of the Thames Gateway and Greater Manchester. But what sort of house does the Captain want, being a man of the highest impeccable sustainability standards he will demand that it is a high density development with a garden; it is near to public transport but gives him somewhere to park the LPG converted BMW; it is energy efficient but it is cooled effectively in the increasingly hot summers; it is fabricated off-site but looks like a traditional brick and block house; it uses environmentally friendly materials but the windows should never need painting; it must minimise waste and water use but be healthy and clean. Can Barratts, Persimmons, CALA and company deliver to his needs? Will an EcoHomes excellent rating be enough for this courageous sustainable brownfield warrior.

As Captain SUBR:IM knows buildings and housing in particular have a profound impact on the environment, resulting in greenhouse gas emissions to the atmosphere. Significant energy is spent in construction, but much more is spent during the life of the building. By buying his new home on a brownfield site the Captain is contributing to sustainable development, after all it is an undeniable fact that building on brownfield sites is a major objective of government and local authorities. Key policies related to wealth creation and the provision of quality affordable homes need brownfield development.

The Commission for Architecture in the Built Environment (CABE for short) has called for better design for high density housing on brownfields. Greater design skills

are indeed required to provide high quality solutions that involve high density, issues such as amenity, daylighting, noise and acoustics become more difficult to achieve satisfactorily. These challenges are all the more acute when the restrictions of poor ground conditions are included.

Portfolio of Sites!!!

The Thames Gateway and Greater Manchester offer stark contrast in terms of the needs of the built environment. In the Thames Gateway high density must be the order of the day. The need to resist flooding or to flood proof the buildings themselves in this area offers the potential for some innovative thinking. Buildings that rise six or twelve storeys do not need to have the ground floor occupied. This separates the users from the potentially disastrous impacts of flooding and at the same time offers a means of separating from the effects of any contamination that might remain in the ground.

Poor ground can result in many more problems common contaminants, such as sulfates and chlorides, cause deterioration of common building materials such as concrete and mortars. The attack is a result of expansive or deleterious reactions within the concrete. Whilst this has been known about for many years and solutions are available, our recent research has shown that a mix of contaminants can cause enhanced deterioration of concrete. This means that much of the existing guidance on sulfate attack will not cover all contamination situations.

As yet I haven't seen any buildings falling down as a result of sulfate attack that is not the case for some buildings built on former steel sites. It is not unheard of for buildings to be un-repairable after being built on certain types of steelmaking slags. These slags undergo expansion and create pressures on the structure that results in cracking and ultimately collapse. It is an interesting experience to inspect a building that is likely to fall down.

Other risks exist to the built environment, but they do not tend to keep consultants, building owners, the public or even researchers awake at night. I can fill an hour or two on the subject, but as this is a discussion piece, perhaps we can generate some discussion on what research is needed and how can we make a difference through SUBR:IM.

Here's a few ideas of issues that are not sorted to get you started discussing:

- 🏗️ Risks to buildings from brownfield land
- 🏗️ Combined contamination and flood risk to buildings
- 🏗️ Brownfield construction process improvement
- 🏗️ Suitable forms of construction for brownfield land
- 🏗️ Aesthetics of new developments on brownfield
- 🏗️ Home-zones on brownfields.

Stephen Garvin

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