



Ecos Maclean Ltd
Engineering - materials, energy, structure

9 October 2018 – Engineering Comment on the Planning Application 2018/3222/P

6 Albert Terrace Mews – Single storey basement extension under existing two storey mews property

I only became aware of this application last week in preparing for the PHCAAC meeting on Wednesday evening, and I apologise for the lateness of this comment. But as you will see, I am attempting only to minimise the impact on the neighbourhood and environment, and in the course of my work I have been told by Camden planners that even late relevant comment needs to be taken into account. The lateness was caused in significant part by my needing to look thoroughly at the lengthy, highly technical BIA to be sure that my concerns about the shortcomings of the engineering in this basement design were well founded.

And yesterday's updated report from the IPCC actually includes that building construction techniques need to be reviewed: they do particularly in places like Camden where the pool of engineering experience does not cover the number of such basement projects.

I am an experienced civil engineer, having worked on many basements in the last 48 years from being on site as the Resident Engineer at the Barbican Arts Centre (over 24m deep in part) sorting out retaining work defects before excavations for the Concert Hall and Theatre could commence, through to numerous domestic scale basements in Camden in challenging sites, much more challenging than at this property. (CV attached).

I have seen the planning application for this property in the course of providing the prints to the PHCAAC (of which I am a member) and I have grave concern that because of the inappropriate engineering understanding I see in its BIA, it will have an unnecessarily extended and protracted construction program and consequential excessive disturbance to the neighbours and the neighbourhood.

There will also be consumed, unnecessary quantities of unsustainable materials (steel and concrete) with consequences for the local environment (and global) through more heavy lorry traffic movements than would arise if this basement had been designed using normal engineering procedures rather than inappropriately sophisticated computer programs, with questionable input data and interpretation of the results. The excessive size, thickness and inappropriate design of retaining elements will also result in a protracted construction programme and extra lorry movements.

In my opinion, some of this environmental damage is the result of the Law of Unintended Consequences kicking in: Camden's policy change intentions of recent years are being subverted by the engineers applying and auditing by rote the policy guidance. Modern engineers with inadequate understanding of clay, experience of actual construction processes evolved over time, and the structural behaviour of the retaining and foundation elements, then produce a (over) design as seen here for 6 Albert Terrace Mews.

And I see that elsewhere in the auditing process, glaring engineering absurdities have not been picked up. It has been said to me specifically in the auditing process on two of our designs recently 'It is a tick box exercise': no it isn't, it is an engineering exercise!

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Unfortunately, now, Camden's policy is being 'met' by 'Designers by App', and paradoxically, the extremely sophisticated 'app' regularly, perhaps inappropriately, used was prepared by the very same company that produced Camden's Guidance on Subterranean Developments, Arup. A clue to over-egging the pudding is in the title: Subterranean. I fail to see how an excavation about 1.5m into the original, greenfield site, warrants such disproportionate analysis and structure compared with a structure that has performed adequately for well over a hundred years.

I believe this basement design, heavily reliant on Arup's program for its validation, should be shown to Arup to see if the input data used was accurate, and the scale of this basement actually appropriate for their App (sophisticated program). Ask, for example, if excavation just 1.5m into the clay with a two storey existing building on top, can be modelled accurately. Ask if there are not inherent scale factors in the analysis that become insignificant when the program is used for 10m excavations, but skew the results where the net excavation is less than the weight of the building added to the ground 150 years ago.

I say, in such a circumstance as this mews (or any basement under an existing building), the scoping process should ask first for the net change on the original ground to be assessed, and if the answer is 'the weight of soil removed is less than that of building originally added', then it is irrefutable logic that the soil under the building cannot heave more than it settled in the first place. The expense, and design then resulting is wholly inappropriate as the experienced (not very) eye should be able to see the magnitude of historic settlement and pro rata the possible heave. The fact that skip lorries did not exist at the time the main housing stock in Camden was constructed is fundamental to this point, and borne out by the site borehole analysis here in the garden which revealed 2m of 'made ground' ie original foundation excavation spoil is still there!

The inherent inappropriateness of the sophisticated approach, together with the lack of understanding of the construction process, and the shortcomings that I see generally in designer skill and experience, means that vertical movement has been overestimated I am sure. However, the possible horizontal movement from construction propping and transferring loads to the pool and floor structure has been overlooked. Here, too, that aspect has not been covered in the BIA as far as I can see: I see no reference in the scheme drawings to horizontal forces, shrinkage of cast concrete slabs and elastic shortening of propping elements which need to be overcome by jacking in the appropriate strains to prevent Party and retaining walls moving horizontally as a result of earth pressures that build with time in clay subsoils particularly. Attached is a photograph in a building that I was asked to look at earlier this year where the junction of Party Wall/transverse walls had separation cracking of 4-5mm, considerably more than predicted. In my assessment, because such horizontal issues had been not considered, as here, purely the sophisticated soil mechanics of vertical loading and unloading overlooks a more significant cause of cracking.

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To summarise, in my opinion, it is likely that considerable savings in materials and construction time, hence disturbance to neighbours and the neighbourhood, can be achieved by a more appropriate/accurate consideration of the following factors (in no particular order):-

1. The net weight of soil being removed from the original site, after assessing the weight of the old and new building.
2. The loadings being applied to the surrounding soil may be excessive, and where there are transitory street loads (dust carts), lesser soil pressure coefficients may be appropriate for a clay subsoil.
3. Reappraisal of the loadings may result in the potential to eliminate steel reinforcement, substantially reducing construction time by excavating pins in the morning and concreting in the afternoon, as before the new Camden policy.
4. The effect of stresses and strains in the completed structure taken into account to minimise horizontal displacement.
5. The temporary 'plunge' columns may be unnecessary with a different sequence, saving time and sacrificial materials.
6. The two stage underpinning may be unnecessarily time consuming for the depth of existing foundations
7. The width of pins may be unduly narrow when consideration of the extent of refurbishment and imperforate Party Walls is taken into account.

Yours,

Nick Maclean

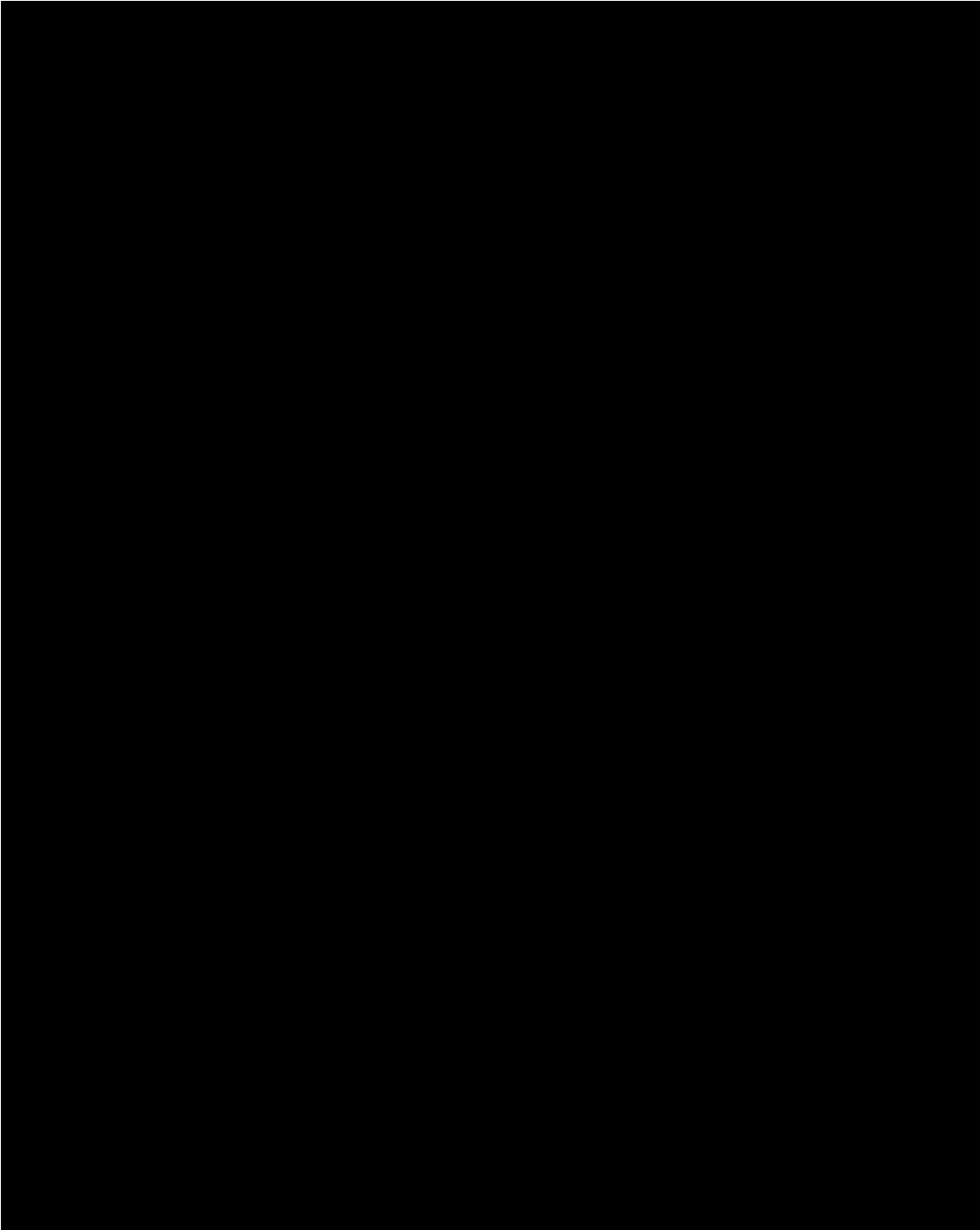
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