PILING STATEMENT

Dakota Hotel Development
Piccadilly Basin
Manchester

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DOCUMENT HISTORY

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1.0 PILING STATEMENT

1.1 Development Overview

The site is currently in use as an 'open-air' pay and display car park. It is proposed to redevelop the site with the construction of a new nine-storey hotel.

A comprehensive ground investigation has been undertaken (report reference 'JPG Geoenvironmental Ground Investigation, Piccadilly Basin, Manchester dated February 2017). The ground investigation established that a Principal Aquifer exists below the proposed development and subsequently highlighted a potential migration pathway from piled foundations. It was also noted that the site is not within a groundwater source protection zone and there are no groundwater abstractions within 500m of the site.

Considering the scale of the proposed development, the magnitude of loading from the superstructure and the findings of the intrusive ground investigation, shallow spread foundations are not suitable for the proposed development and a piled foundation solution is the only viable option. A piling technique which mitigates risk to the underlying aquifer has therefore been selected. Using the selected piling technique, the risk of creating a migration pathway is now considered to be low.

1.2 Proposed Piling – Mitigating Risk to Principal Aquifer

Following an appraisal of the various piling techniques available, and guidance taken from the Environment Agency document 'Piling in layered ground: risks to groundwater and archaeology', Continuous Flight Auger (CFA) type piles have been selected on the basis that this type of pile, and the way in which it is constructed, is considered the preferred piling technique to mitigate the risk of creating a potential migration pathway to the underlying aquifer.

The following comments are offered in support of the proposed piling technique:

- CFA piles are a replacement technique whereby, in simplistic terms, all material is removed and replaced with fluid concrete. (Generally all material is removed from the bore with no downward migration of material from ground level to the base of the pile).
- Given that CFA piles are drilled with a helical auger, it is not considered that surface material is drawn down to the toe of the pile. (Material is typically elevated to the surface by "corkscrew action" for disposal off site).
- Unlike rotary augers piles, CFA piles do not remove bore spoil material in the temporary condition, i.e. the bore is not left open for contaminated material to fall from the surface to the base of the pile, therefore migration of material from upper to lower horizons is unlikely.
- Once the CFA augers are drilled to the required depth, concrete will be pumped directly into the base of the pile (via a hollow stem in the centre of the augers). Once the concrete is under positive pressure, the augers will be extracted and concrete simultaneously pumped to fill the subsequent void.

- The construction of individual piles is a continuous process until the auger is fully extracted out of the ground and the pile bore filled (to ground level) with concrete.
- Most high-rise buildings within vicinity of the proposed development will be supported on piled foundations with similar environmental conditions and constraints.

1.3 Proposed Piling – Vibration Control

Significant ground vibrations could potentially affect any structures within the vicinity of the vibration source. As the proposed development occupies a relatively small footprint within a city centre, and in relatively close proximity to other building structures, due consideration has been given to vibration and noise control for all site activities, including piling.

Driven piling techniques are considered inappropriate for the proposed development in this instance due to the adverse levels of vibration and noise that are associated with this type of piling.

In comparison to driven piling techniques, the selected CFA piles are regarded as generating minimal noise and vibrations, with typical peak particle velocities (PPV's) in the order of 2 to 5mm/s. Higher readings can sometimes be encountered if, for example, drilling is required within soils containing obstructions, such as relic foundations, etc. However, such material is generally encountered nearer the surface thereby enabling removal and disposal off site prior to the commencement of any piling operations.



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