

Environmental Assessment for Foundation Piling

Selection of Piling Method

Driven precast concrete piles are proposed

The purpose of this assessment is to identify what risks to the environment piling may introduce and to put in place mitigation measures that will remove any significant adverse environmental impacts.

The assessment will be carried out using the risk assessment flowchart from National Groundwater & Contaminated Land Centre Report NC/99/73 (figure 6.1)

The six pollution scenarios suggested in Report NC/99/73 are considered in terms of their potential Source-Pathway-Receptor linkages and how our proposed precast pile deals with each scenario:

Pollution Scenario 1

Creation of preferential pathways, through a low permeability layer to allow potential pollution of an aquifer.

Creation of preferential pathways down the pile shaft is a potential risk on any site with contaminated soils. By using driven piles soil will be densified as it is displaced laterally and the high soil stresses set up during driving will inhibit groundwater flow in the fill. A suitable analogy would be to compare the driving of a nail into a block of wood; the harder the wood, the more difficult it is to extract the nail because of the grip that the wood exerts.

Once piles penetrate any soft clays and silts these cohesive soils will remould and adhere to the pile shaft and an improvement in the soil/pile shaft contact will result rather than a reduction caused by creating gaps.

This is in fact the same action that permits the effects of surcharging such soft materials to exert negative skin friction on piles in addition to the pile head load (this effect is routinely accounted for in pile design). If a 'gap' had been created, there would be no negative skin friction and hence no need to calculate the value.

This pollution scenario is not considered to present a significant risk in the context of the risk assessment process carried out, which has been in accordance with Government guidance.

Pollution Scenario 2

Creation of preferential pathways, through a low permeability surface layer, to allow migration of landfill gas, soil gas or contaminant vapours to the surface.

For the reasons stated previously, the creation of preferential pathways up the pile shaft to allow migration of gas or vapours is not considered to be a significant risk. However, the proposed development will need to include appropriate gas/vapour protection measures, incorporated largely as a precautionary measure.

Pollution Scenario 3

Direct contact of site workers and others with contaminated soil arisings, which have been brought to the surface.

During the pile driving process there is normally no removal of soil, and consequently this is not a significant risk. If obstructions are encountered that impede the driving of piles, safe procedures for handling and disposal of contaminated soil will be followed.

Pollution Scenario 4

Direct contact of the piles or engineered structures with contaminated soil or leachates causing degradation of pile materials.

The driven precast concrete piles proposed are capable of resisting the levels of pre-remediation contamination indicated, and so no significant risk exists.

Pollution Scenario 5

The driving of solid contaminants down into an aquifer during pile driving.

It is widely recognised that driven piles displace soil laterally rather than downwards. The Centrum precast concrete pile is manufactured with a slightly convex “domed” end to the pile segment, further reducing the risk of driving down contaminants.

Pollution Scenario 6

Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.

As the proposed pile is precast off site, there is no contamination of groundwater with wet concrete, cement paste or grout.

Conclusion

Should contaminants be present the choice of a driven pre-cast concrete piling system will not worsen the situation in respect of contamination of groundwater or exposure of human beings to contaminants within the ground.