

| POLLUTION SCENARIO | DCIS | CFA | Driven Precast | VCC | VIBRO | DC |
|---|---|---|--|--|---|--|
| POLLUTION SCENARIO 1 Creation of preferential pathways through an aquitard to allow potential contamination of an aquifer below | <u>Advantages</u> Piling densifies the soil around shaft reducing permeability Concrete cast directly against the soil potential flow path sealed <u>Disadvantages</u> Possible temporary flow path due to oversize shoe in temporary condition Potential for Pollution greatest where aquitard is thin | <u>Advantages</u> Concrete cast directly against the soil so any potential flow path sealed <u>Disadvantages</u> Potential for pollution greatest where aquitard is thin Possible temporary flow path during boring | <u>Advantages</u> Piling densifies the soil around the pile shaft reducing permeability The aquitard will maintain a seal against the pile shaft if two pile diameters or more thick. <u>Disadvantages</u> Potential for Pollution greatest where aquitard is thin | <u>Advantages</u> Soil densified around pile shaft reduces permeability Concrete cast directly against soil so any potential flow path sealed <u>Disadvantages</u> Potential for pollution greatest where aquitard is thin | <u>Advantages</u> No spoil <u>Disadvantages</u> High permeability of columns will create a preferential pathway. Only problem if there is a source or receptor. | <u>Advantages</u> Voids collapsed to inhibit migration of potential contaminant. Heavily compacted surface inhibits ingress of water into ground <u>Disadvantages</u> Can create near-surface shear in clayey soils as short-term preferential pathway May have to limit energy input to avoid shear of basal clay layer overlying aquifer Potential greatest where aquitard thin |
| POLLUTION SCENARIO 2 Creation of preferential pathways through a low permeability surface layer, allowing migration of landfill gas, soil gas or contaminant vapours to the surface | <u>Advantages</u> Piling densifies the soil around the shaft reducing permeability Concrete cast directly against the soil so any potential flow path sealed <u>Disadvantages</u> Any seating membrane or capping will be punctured – deal with by follow on works Heaving could disrupt low permeability layer | <u>Advantages</u> Concrete cast directly against the soil so any potential flow path sealed <u>Disadvantages</u> Puncture of sealing membrane or capping – would need dealing with by follow on works | <u>Advantages</u> Piling densifies the soil around the pile shaft reducing permeability <u>Disadvantages</u> Any seating membrane or capping will be punctured – needs dealing with by follow on works Heaving could disrupt low permeability layer | <u>Advantages</u> Soil densified around pile shaft reduces permeability Concrete cast directly against soil so any potential flow path sealed <u>Disadvantages</u> Puncture of sealing membrane or capping needs with by follow on works | <u>Advantages</u> None in this scenario – unless intentional gas venting is required <u>Disadvantages</u> Puncture of sealing membrane or capping needs dealing with by follow on works High permeability of columns may allow gas to escape or air to enter an active venting system | <u>Advantages</u> Collapse of voids by process can inhibit long-term migration of gas to surface <u>Disadvantages</u> Impacts can force gas out of the ground and can cause generation of gas from old refuse fill |
| POLLUTION SCENARIO 3 Direct contact of site workers and others with contaminated soil arisings that have been brought to the surface | <u>Advantages</u> No spoil produced <u>Disadvantages</u> Heave a later removal of excess material may expose contaminated soil | <u>Advantages</u> Contaminated soil brought to ground surface. Possible mixing of 'clean' and contaminated soil. <u>Disadvantages</u> | <u>Advantages</u> No spoil produced <u>Disadvantages</u> Heave a later removal of excess material may expose contaminated soil | <u>Advantages</u> No spoil produced <u>Disadvantages</u> | <u>Advantages</u> No spoil produced <u>Disadvantages</u> | <u>Advantages</u> No spoil produced <u>Disadvantages</u> |
| POLLUTION SCENARIO 4 Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of materials | <u>Advantages</u> Fairly well researched. Adequate mix design required <u>Disadvantages</u> Particular care may be required if site is contaminated with known deleterious substances | <u>Advantages</u> Fairly well researched. Adequate mix design <u>Disadvantages</u> Particular care may be required if site is contaminated with known deleterious substances | <u>Advantages</u> Fairly well researched. Adequate mix design required <u>Disadvantages</u> Particular care may be required if site is contaminated with known deleterious substances | <u>Advantages</u> Fairly well researched. Adequate mix design required <u>Disadvantages</u> Particular care may be required if site is contaminated with known deleterious substances | <u>Advantages</u> Consideration of durability of stone in prevailing ground conditions required <u>Disadvantages</u> Particular care may be required if site is contaminated with known deleterious substances | <u>Advantages</u> No added materials <u>Disadvantages</u> |
| POLLUTION SCENARIO 5 The pushing of solid contaminants down into an aquifer during pile driving | <u>Advantages</u> Concern expressed over driving of wedge of contaminated soil at pile toe. An unlikely scenario as piles driven through soft clay would have a 'soft toe' - not found in practice. In any case amount of soil involved very small Mitigation by use of conical or convex shoe possible <u>Disadvantages</u> | <u>Advantages</u> Not applicable to CFA <u>Disadvantages</u> | <u>Advantages</u> Concern expressed over driving of wedge of contaminated soil at pile toe. An unlikely scenario as piles driven through soft clay would have a 'soft toe' - not found in practice. In any case the amount of soil involved very small. Mitigation by use of a cast in pointed base to the pile. <u>Disadvantages</u> | <u>Advantages</u> Horizontal displacement of densification of the soil predominates. In normal circumstances soil will not be dragged down <u>Disadvantages</u> | <u>Advantages</u> As per VCC's <u>Disadvantages</u> | <u>Advantages</u> Effect reduces with depth to reduce such potential but care to avoid shear of basal clay layer as above <u>Disadvantages</u> |
| POLLUTION SCENARIO 6 Contamination of groundwater and, subsequently, surface waters by wet concrete, cement paste or grout | <u>Advantages</u> Grout/cement only remains mobile until hardened <u>Disadvantages</u> Only if grout/cement is in contact with fast flowing groundwater is there potential for contamination. Product not liable to use in such a scenario | <u>Advantages</u> Grout/cement only remains mobile until hardened <u>Disadvantages</u> Only if grout/cement is in contact with fast flowing groundwater is there potential for contamination. Product not liable to use in such a scenario | <u>Advantages</u> Not applicable. <u>Disadvantages</u> Not applicable. | <u>Advantages</u> Grout/cement only remains mobile until hardened <u>Disadvantages</u> Only if grout/cement is in contact with fast flowing groundwater is there potential for contamination. Product not liable to use in such a scenario | <u>Advantages</u> Not applicable <u>Disadvantages</u> Not applicable Not applicable | <u>Advantages</u> Not applicable <u>Disadvantages</u> Not applicable |