



What are reinforced gravel rafts?

Reinforced gravel rafts involve the construction of a 1.2m-deep compacted 'raft' of engineered aggregate (gravel).

Once constructed the shallow gravel raft provides a stable platform on which a house can be built on land vulnerable to liquefaction. The platform is designed to reduce the effects of liquefaction in a future earthquake.

Reinforced gravel rafts can only be constructed on land clear of buildings.

How do reinforced gravel rafts work?

Reinforced gravel rafts are designed to limit the consequences of liquefaction. They are designed to

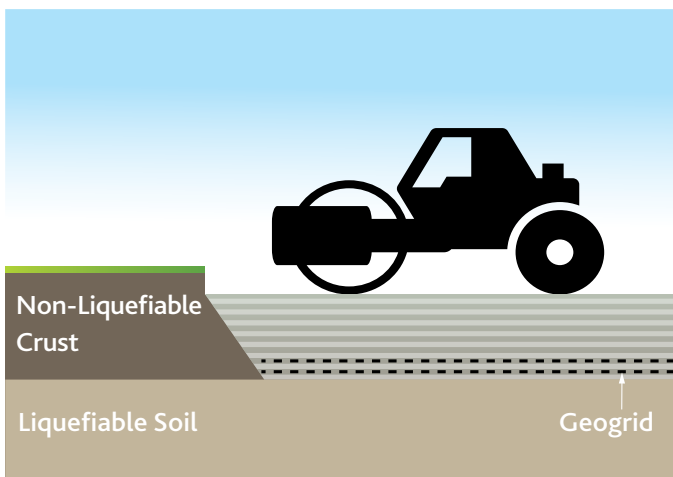
be stiff enough to limit undulations, tilt and uneven ground surface subsidence, therefore reducing damage to house foundations.

How are reinforced gravel rafts constructed?

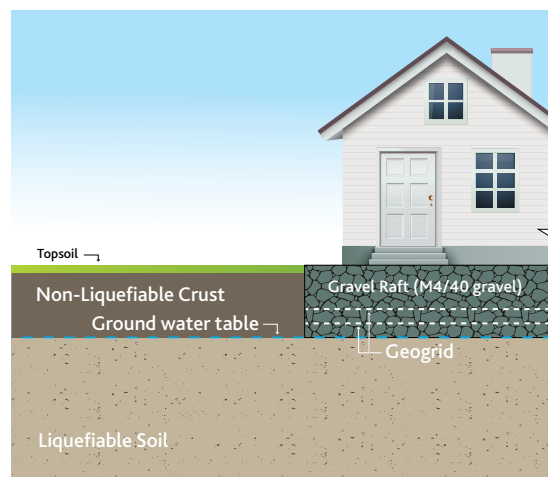
Construction of reinforced gravel rafts is relatively straightforward and can be completed with standard earthworks machinery. Using excavators (commonly 14 to 20 tonne), soil is excavated down to the designed depth of the rafts, typically around 1.2m thick.

Excavated soil is removed. Existing topsoil may be stored for gardens and lawns. Layers of crushed gravel are spread

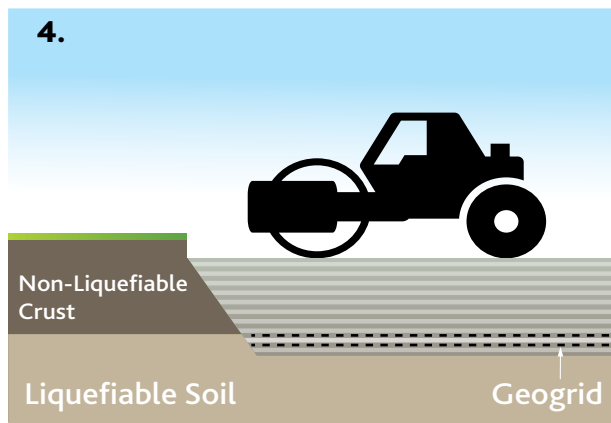
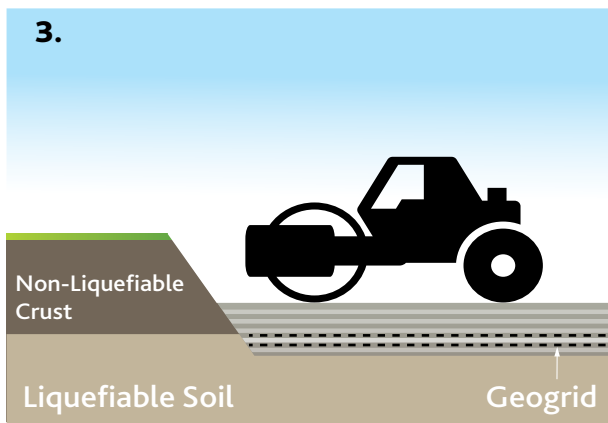
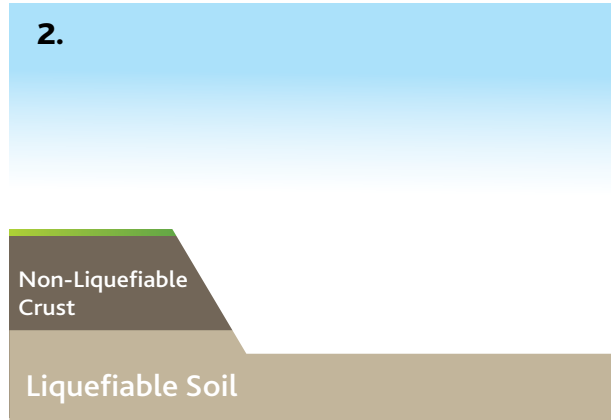
A shallow reinforced gravel raft provides a stable platform on which a house can be built in areas vulnerable to liquefaction. The platform is designed to reduce uneven settlement caused by liquefaction in a future earthquake



Reinforced gravel raft under construction



A reinforced gravel raft beneath a rebuilt dwelling



Reinforced gravel raft construction

over the base of the excavation and compacted using a 1.5 to 10 tonne roller compactor.

Near the base of the raft two or three layers of geogrid are rolled out at different depths. Additional gravel layers are placed into the excavation and compacted, all the way up to the ground surface.

Construction in wet weather should generally be avoided as flooding can result.

What soils suit reinforced gravel rafts?

Reinforced gravel rafts are suitable for most soil conditions encountered in Canterbury, including silts and sands. However, very weak and highly-compressible deep organic soils are unsuitable for the raft as these soils make gravel placement and compaction difficult. In addition, the future weight of the raft and house may cause excessive consolidation settlement of these weak or compressible underlying soils. The raft may be thickened so it is founded on a more suitable soil. An advantage of these rafts is that they can be used in areas with lateral spread vulnerability.



Reinforced gravel raft – geogrid and gravel installation



Roller compactor used to compact gravel