bentonite suspension and previously used bentonite suspension, and any process which may be used to remove impurities from previously used bentonite suspension. When the results show consistent behaviour, the tests for shear strength and pH value may be discontinued, and tests to determine density and viscosity shall be carried out as agreed with the Engineer. In the event of a change in the established working pattern, tests for shear strength and pH value shall be reintroduced for a period if required.

1.3.10 Grouting

A. Upon completion of a section the grout should be pumped through all lubrication holes. The pressure and quantity of grout injected shall be calculated by the Contractor and approved by the Engineer.

B. Grouting shall begin at the lower holes systematically working from one end of the pipe jack to the other. Where injection holes can be opened without loss of ground, grout shall be pumped through the lower injection holes until it emerges from the upper holes.

C. Grouting progress shall be continuously monitored to ensure there is no heave.

D. The carrier pipe and joints shall be protected from the possible adverse physical or chemical effect of grout. Compressible material shall be wrapped around the carrier pipe if required.

E. A free venting standpipe of not less than 100mm diameter on the grout injection feed shall be installed to restrict grouting pressures to a maximum of 1 bar.

F. Lubrication holes shall be plug watertight on completion and good pipe lining or coating shall be made. The pressure of the lubricant shall be maintained when it is to be replaced by grout.

1.3.11 Monitoring Ground Surface Movement

A. The Contractor shall continuously monitor the ground surface adjacent to structures and buried utilities and shall control activities such as excavation, tunneling and dewatering to prevent movement and or damage to existing structures.

B. Movement points shall be installed and monitored prior to any excavation associated with the pipeline.