J. Entry and exit sealing rings shall be provided to ensure a watertight joint around the pipe at all times.

1.3.5 Tunnelling

A. Before any particular tunneling commences, the Contractor shall provide sufficient pipes, and, if required, provide intermediate jacking station assemblies to ensure continuous operation.

B. The Contractor shall carry out the tunnel construction using the recommended accepted method to the satisfaction of the Engineer and to meet the contents of these specifications.

C. The thrust force shall be limited to the maximum permissible as determined and based on submitted and approved calculations.

D. Excavation rate shall not exceed the horizontal drive rate throughout the operation.

E. The Contractor shall prevent both subsidence and heave during all stages of the setting up, tunneling operation and dismantling.

F. The Contractor shall remove slurry/excavated soil mixture properly from the excavation, settle in a stilling basin and remove from the site to a suitable location. Stock piling on site shall be avoided.

G. The Contractor shall maintain tunnel face support for balancing full earth pressure and groundwater pressures.

H. Tunneling operation shall be run continuously between drive and reception pits/shafts.

I. Cuttings spoil removal and cutter face operation is not permitted when the pipe thrust is not being carried out.

J. The annular overbore voids around the outside of the pipe shall be filled to avoid collapse and upward migration of the void prior to permanent grouting. Drilling fluid injection overpressure shall be avoided.

K. Casing and carrier pipes: Carrier pipe sections shall be placed and joined individually within the sleeve or mount on guide rails or trolleys in such a manner as to transmit the pulling/pushing forces through the carriage and not through the pipe.

1.3.6 Packing

A. Packing shall be cut to dimensions that ensure the full bearing width of the