

- C. The optimum location for points to monitor existing structures shall be determined and submitted to the approval of the Engineer.
- D. Monitoring points shall be provided within the existing structures and on the road surface and submitted to the approval of the Engineer. Generally, monitoring points along the road surface shall be located along the pipe centerline on each side. The distance for the location of the monitoring points along the same line shall be calculated to fall within the HS 20 wheel loads in each lane. Points on existing structures shall be located approximately 500mm above the ground surface. Location of settlement points in the vicinity of the pits/shafts will be agreed with of the Engineer.
- E. All points shall be monitored with reference to benchmarks located outside the area of influence of the Works. Monitoring shall demonstrate repeatability to 3mm.
- F. The elevations of monitoring points shall be obtained as described below.
  - 1. For monitoring points within 20m of the heading, after each advance of 5m.
  - 2. For monitoring points greater than 20m but less than 100m away from the heading, daily.
  - 3. The monitoring point elevations shall be reported to the Engineer within 24 hours during the course of construction of the pipeline and related pits/shafts.
- G. Should surface movement occur greater than the specified limits, at any location affected by the Works, the Engineer may require modification of the method or sequence of the work or a shutdown of the work to make appropriate changes in the construction operation. Changes required to keep surface movement within the specified acceptable limits shall be made solely at the Contractor's expense.
- H. Upon completion of the pipeline, monitoring of point elevations shall be continued during the maintenance period as required by the relevant authority. Findings shall be recorded and reported to the Engineer on a monthly basis. If the specified limits are exceeded, they shall be reported immediately and a proposal to rectify the road surface and prevent further settlement shall be submitted.

### **1.3.12 Pipe Testing**