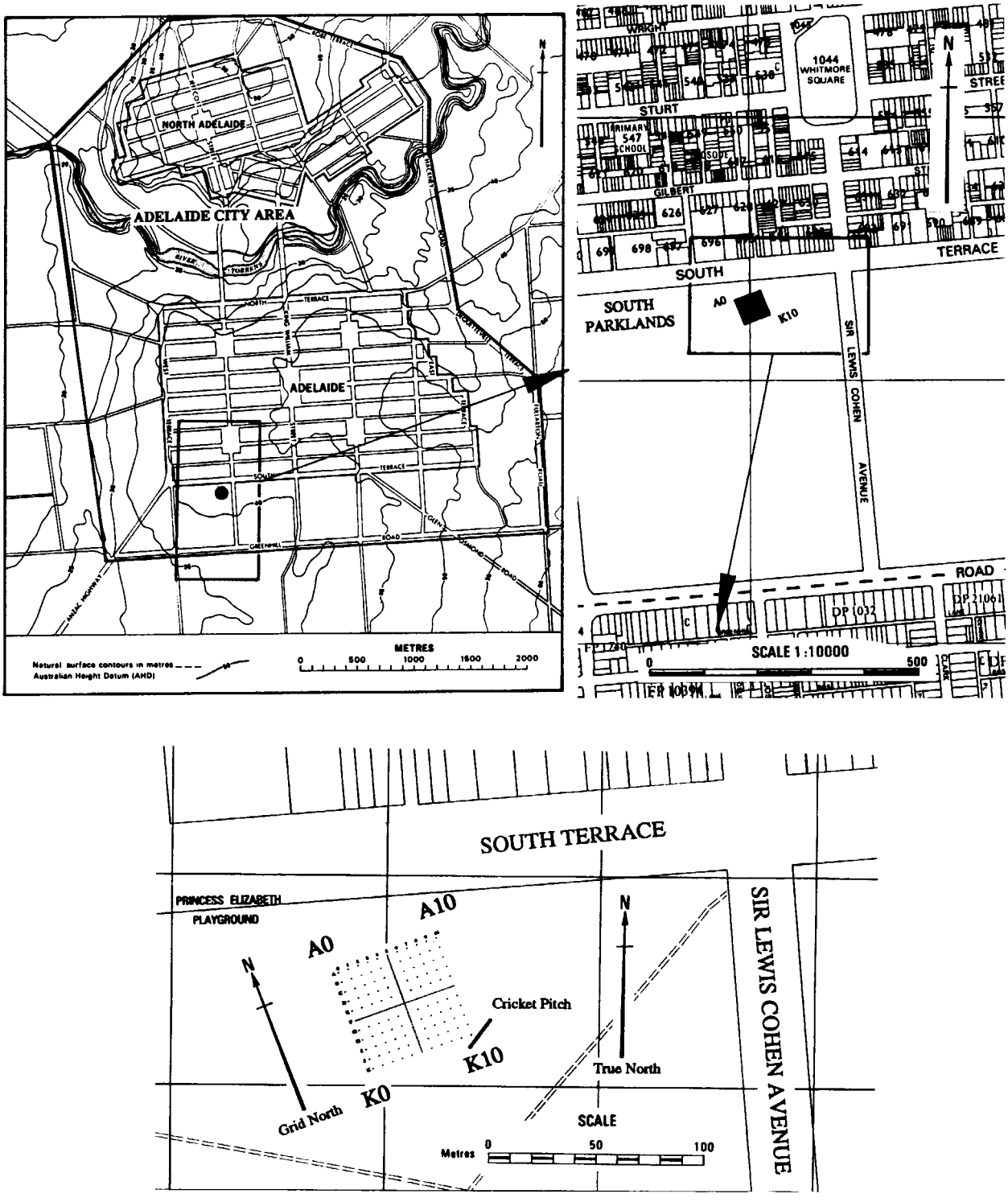

Figure 4.1 Location of field study site.

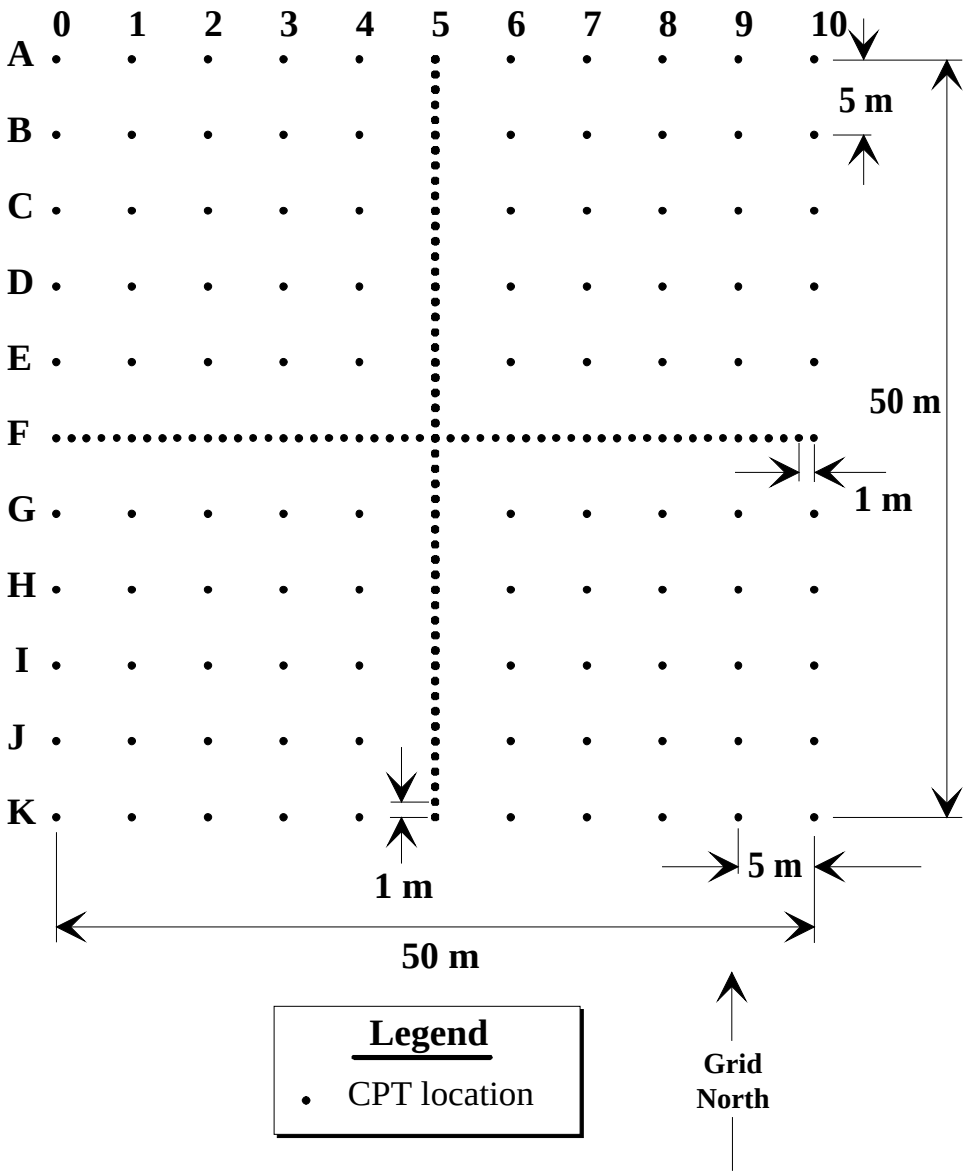

Figure 4.2 Initial layout of field testing.

resistance, q_c, and sleeve friction, f_s, would be recorded, due to the spacing of measurements being 5 mm, as detailed in Chapter 3. The orientation of the CPTs, as shown in Figure 4.1, was chosen to avoid large trees, overhead electrical cables and a concrete cricket pitch.

It is common practice, when investigating the spatial variability of soils and rock, to use a sampling pattern which is regular and either in the form of a square grid, or along a straight line. In particular, in the field of geostatistics, it is common place to use regular square grid sampling (Brooker, 1975; Journel and Huijbregts, 1978; Clark, 1979; Rendu, 1981; Azzouz and Bacconnet, 1991; Brooker, 1991). Journel and Huijbregts (1978) recommended that, initially, sampling should be carried out on a large, and more or less, regular grid which is

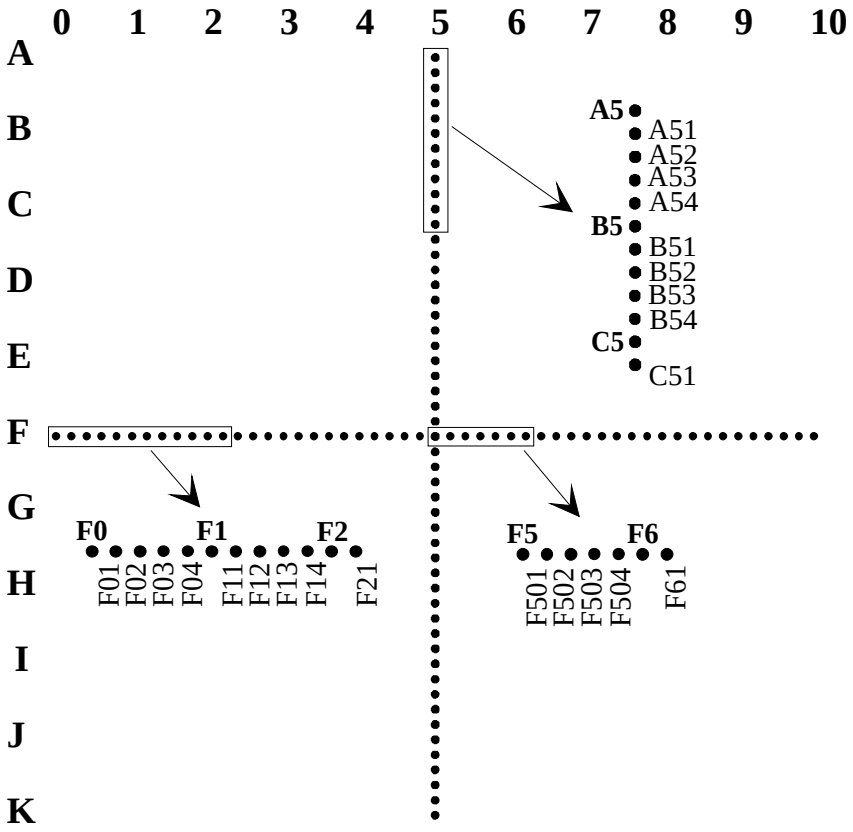

Figure 4.3 Referencing system used for the one metre, laterally spaced CPTs.

then followed by *in-fill drilling*, that is, sampling on a progressively smaller grid. Furthermore, it is possible to show, using geostatistics, that samples located on a regular, or near regular grid, provide more information than randomly located samples (Matheron, 1963; Rendu, 1981).

In the application of random field theory to the spatial variability of geotechnical materials, it is common practice to use either: samples taken along straight lines at regular, or irregular, intervals (Lumb, 1974, 1975; Anderson et al., 1984; Bergado et al., 1992); or samples obtained from regular, or near regular, square grids (Tang, 1979; Smith, 1981; Fardis and Veneziano, 1981). As shown in Figure 4.2, the proposed testing layout conforms with sampling regimes generally accepted in both the fields of geostatistics and random field theory.

4.3.2 Equipment and Methods

So that the results of the field testing would enable an accurate assessment of the spatial variability of undrained shear strength to be made, it was essential that testing be carried