

5 September 1990

Works Branch Technical Circular No. 13/90

Ground Investigation

Introduction

This Circular supersedes Lands and Works Branch Technical Circular No. 15/83, which is hereby cancelled. It describes the ways in which ground investigation, including laboratory testing, is to be procured, and it details the responsibilities of the parties involved. The contents of the Circular have been agreed by the Secretary for Planning, Environment & Lands.

2. The Materials Division of the Geotechnical Control Office (GCO), Civil Engineering Services Department, provides a service to other Departments within Government by letting and administering term contracts for land and marine ground investigations, including geophysics and soil and rock testing. In order to co-ordinate ground investigation works, the Division also manages the Lists of Specialist Contractors for Ground Investigation Field Work and Soil & Rock Testing, and it maintains an up-to-date schedule of ground investigation contractors' commitments to Government.

Planning and Procurement

3. At least four months lead time should be planned for major ground investigations; otherwise, it may not be possible to complete the fieldwork and laboratory testing according to the required schedule.

4. The proper planning of a ground investigation is essential if the field work is to identify all the geotechnical problems of the site and provide adequate data for safe and economic design and construction. A ground investigation should therefore be planned by a suitably qualified and experienced person who is thoroughly familiar with the project requirements, and it should not be delegated to junior or inexperienced members of staff. Chapter 7 of "Geoguide 2 : Guide to Site Investigation" (GCO, 1987) gives guidance on the planning of a ground investigation, and Chapter 15 of the Geoguide advises on suitable personnel for this. LWB Technical Circular No. 14/87 gives procedures to be followed for ground investigation in the vicinity of the MTR.

5. The Geotechnical Information Unit (GIU) of the Civil Engineering Services Department should be consulted in all cases during the planning of a ground investigation. This contains numerous records of ground investigations throughout the Territory, as well as laboratory test results on soil and rock samples. The operations of the GIU are described in LWB Technical Circular No. 11/87.
6. The Materials Division shall be consulted on all ground investigation contracts. The methods available to Government Departments for procuring ground investigation are as follows :
- (a) **Ground investigation field work** - This shall be carried out under the GCO's term contracts or under individual ground investigation contracts let by the Client Department, its consultants or the Materials Division. Requests to GCO for investigations estimated to cost in excess of \$0.75 million for land works and \$1.5 million for marine works will in general be considered for execution through individual contracts, depending on the nature and scope of the investigation and the current commitments of the GCO term contractors.
 - (b) **Laboratory testing** - This shall normally be carried out at a Public Works Laboratory or under a GCO term contract for laboratory testing. However, where an individual contract is let for the field work, the laboratory testing should normally be included in the contract.
7. Where provisions for ground investigations are included in contract documents for capital works projects, Government Departments shall ensure that these documents stipulate that only contractors on the Lists of Specialist Contractors for Ground Investigation Field Work and for Soil & Rock Testing shall be employed for such works, and the Materials Division shall be advised of the works.

Documents and Reports to GCO

8. Before a Client Department or its consultant calls tenders for a ground investigation contract, a copy of the proposed tender documents shall be submitted to the Chief Geotechnical Engineer/Materials in order that he may advise on the technical aspects of the tender documents. This advice shall be obtained **prior** to sending documents to contractors on the List of Specialist Contractors for Ground Investigation Field Work.
9. Where a Client Department or its consultant administers a ground investigation contract, copies of the priced contract documents, all quarterly reports on the performance of the contractor, and a copy of all final ground investigation reports shall be sent to the Materials Division.

Client Department Responsibilities

10. The following important guidelines should be followed by Client Departments in order for them to obtain a satisfactory ground investigation service through the Materials Division :

- (a) **Project programme** - The project programme should be carefully considered, and sufficient notice of the required ground investigation must be given to the Materials Division to allow adequate time for mobilization and for the completion of field work and laboratory testing.
- (b) **Confirmation of land matters** - Land matters must have been dealt with before the programmed start of the field work, and confirmation must be given in writing that unhindered access is available to transport equipment to site and to enable work to be carried out on the site for the duration of the investigation.
- (c) **Site supervision** - Details of the Client Department's or its consultant's technical site supervision should be provided to the Materials Division.
- (d) **Investigation scope** - The scope of the ground investigation and the necessary technical details should be finalized as far as possible (e.g. numbers and depths of boreholes, trial pits, insitu tests, etc.), and these should be specified, together with sampling type and pattern and field installations required. An outline of the likely laboratory testing requirements should also be given.
- (e) **Funds** - Confirmation must be given in writing at the time of the request that funds are available to pay for the work.

Supervision

11. The Materials Division of the GCO is responsible only for the administration of contracts, and the level of technical supervision appropriate to the investigation must be provided by the Client Department or its consultants on both term contracts and individual contracts. This is essential if a cost effective investigation of adequate quality is to be carried out. Where a consultant is to be responsible for the investigation, the Client Department should ensure that the costs of site supervision are allowed for when obtaining funds for the project.

12. Guidance on appropriate levels of supervision of ground investigations can be obtained from Chapter 15 of Geoguide 2, and further guidance may be obtained from the Materials Division. It is recognised that the recommendations of Geoguide 2 on site supervision may initially be difficult for some Client Departments to meet. Relaxation of the technical qualifications of the supervising personnel can be considered for individual cases, but this should be done in the context of the complexity of the ground conditions, the nature of the project, and staff availability. It is important that Client Departments' professional and technical staff build up experience in ground investigation, so that only experienced persons are involved with the supervision of field and laboratory testing work. Training courses for technical staff engaged in the supervision of ground investigation are organized by the GCO, and details of these can be obtained from the Chief Geotechnical Engineer/Materials.

13. Details of the site supervision proposed for a ground investigation should be provided to the Chief Geotechnical Engineer/Materials prior to the commencement of the investigation. He will advise the appropriate Directorate officer of the Client Department if he considers the proposed level of supervision to be inadequate and will recommend any changes needed to increase the effectiveness of the investigation.

14. Where an individual contract is let and administered by either the Client Department or its consultant, the documents shall include requirements for the provision by the contractor of sufficient properly experienced technical staff to ensure that the works are carried out according to specification.

15. Client Departments should also provide an appropriate level of supervision for laboratory testing. The involvement of a professional at the laboratory is essential at an early stage in the programme of laboratory testing if the maximum benefits are to be gained from the programme. The personnel responsible for specifying laboratory testing and interpreting the results should be experienced in this aspect of ground investigation. They should make periodic visits to the laboratory during routine testing, and the more complex tests should be supervised full-time.

Specialist Advice

16. It may be necessary for the Client Department to seek the advice of a specialist on particular aspects of a ground investigation. Guidance on this is given in Chapter 15 of Geoguide 2. In certain cases, it may be advisable to involve the specialist at the planning stage of the ground investigation. For example, geological information to assist the planning of ground investigations can be sought from the Hong Kong Geological Survey, located in the GCO.

Public Utilities

17. The GCO's ground investigation term contractors will not undertake excavation works that are solely for the purpose of locating public utilities. However, inspection pits will be sunk by a term contractor prior to the commencement of drilling and probing works to safeguard against damage to underground utilities.

(K W K Kwok)
Secretary for Works