

## Appendix D

Summaries for Geoguide 2 : Guide to Site Investigation

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigations						
Revised, Withdrawn	N/A	GEO2:5930-2a	3	This Geoguide presents a recommended standard of good practice for site investigation in Hong Kong, the need for which was formally recognized as early as July 1983 by the Subcommittee of the Building Authority Working Party on Geotechnical Regulations. In its format and content, the Geoguide follows closely the <b>British Standard BS 5930 : 1981, Code of Practice for Site Investigations</b> , but the recommendations in the British Standard have been adapted to suit local conditions and practices. It should be used in conjunction with the companion document, Guide to Rock and Soil Descriptions (Geoguide 3). These Geoguides expand upon, and largely replace, Chapter 2 of the Geotechnical Manual for Slopes.	1981a; Historical; GEO2:5930-2a; The information is historic and factually correct. Consequently there is no requirement to change this text as to do so would invalidate the Foreword.	1
Revised, Withdrawn	N/A	GEO2:5930-2b	3	This Geoguide covers <b>Sections 1 to 7 of BS 5930</b> , while Section 8 is dealt with in Geoguide 3. It has been prepared in such a way that the organization and format of the British Standard have generally been preserved. Where portions of BS 5930 have been adopted in the text without significant amendment, this is clearly denoted by the use of an <i>italic</i>	1981a; Historical; GEO2:5930-2b; The information is historic and factually correct. Consequently there is no requirement to change this text as to do so would invalidate the Foreword.	1
Revised, Withdrawn	N/A	GEO2:5930-2c	3	This Geoguide covers Sections 1 to 7 of BS 5930, while Section 8 is dealt with in Geoguide 3. It has been prepared in such a way that the organization and format of the British Standard have generally been preserved. <b>Where portions of BS 5930 have been adopted in the text without significant amendment, this is clearly denoted by the use of an italic</b>	1981a; Historical; GEO2:5930-2c; The information is historic and factually correct. Consequently there is no requirement to change this text as to do so would invalidate the Foreword.	1
Revised, Withdrawn	N/A	GEO2:5930-3a	19	This Geoguide deals with the investigation of sites in Hong Kong for the purposes of assessing their suitability for civil engineering and building works, and of acquiring knowledge of site characteristics that affect the design and construction of such works and the security of adjacent properties. It is essentially <b>BS 5930 1981, Code of Practice for Site Investigations (BSI, 1981a)</b> , modified as considered desirable for use in Hong Kong.	1981a; Historical; GEO2:5930-3a; The information is historic and factually correct. Consequently there is no requirement to change this text.	1
Revised, Withdrawn	N/A	GEO2:5930-3b	19	<b>While the basic structure and philosophy of BSI (1981a) has been maintained in this Geoguide, topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience.</b> Other sections of BSI (1981a) have been repeated herein without significant amendment, and this has been denoted by an <i>italic</i> script. Less relevant or rarely-used portions of BSI (1981a) have been incorporated only by reference, or have been specifically deleted.	1981a; Historical; GEO2:5930-3b; The information is historic and factually correct. Consequently there is no requirement to change this text.	1
Revised, Withdrawn	N/A	GEO2:5930-3c	19	While the basic structure and philosophy of BSI (1981a) has been maintained in this Geoguide, topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience. <b>Other sections of BSI (1981a) have been repeated herein without significant amendment, and this has been denoted by an italic script.</b> Less relevant or rarely-used portions of BSI (1981a) have been incorporated only by reference, or have been specifically deleted.	1981a; Historical; GEO2:5930-3c; The information is historic and factually correct. Consequently there is no requirement to change this text.	1
Revised, Withdrawn	N/A	GEO2:5930-3d	19	While the basic structure and philosophy of BSI (1981a) has been maintained in this Geoguide, topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience. Other sections of BSI (1981a) have been repeated herein without significant amendment, and this has been denoted by an <i>italic</i> script. <b>Less relevant or rarely-used portions of BSI (1981a) have been incorporated only by reference, or have been specifically deleted.</b>	1981a; Historical; GEO2:5930-3d; The information is historic and factually correct. Consequently there is no requirement to change this text.	1
Revised, Withdrawn	N/A	GEO2:5930-3e	19	<b>In this Geoguide, as in BSI (1981a), the expression "site investigation" has been used in its wider sense. It is often used elsewhere in a narrow sense to describe what has been termed herein "ground investigation".</b> The use of soil and rock as construction materials is treated only briefly; further information on this is given in BSI (1981 b).	1981a; Historical; GEO2:5930-3e; Although the citation is an historic reference to BS5930:1981, it is non-technical. The definition of "site investigation" can be self-contained in Geoguide 2. Therefore the citation should be deleted.	2
Revised, Withdrawn	N/A	GEO2:5930-4	19	<b>The last section of BSI (1981a), which deals with the description of soils and rocks, is not covered in this Geoguide.</b> A companion document, Geoguide 3: Guide to Rock and Soil Descriptions (GCO, 1988), has been devoted entirely to this topic, and the reader should refer to it for guidance on the description and classification of Hong Kong rocks and soils.	1981a; Historical; GEO2:5930-4; The citation is the last historical reference to BS5930:1981 in the main body of Geoguide 2. The information is historic and factually correct. Consequently there is no requirement to change this text.	1
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-5	82	18.3 HEADINGS OR ADITS Headings are driven from the bottom of shafts or laterally into sloping ground, and can be used for the insitu examination of the ground or existing foundation structures, and for carrying out special sampling or in situ testing. <b>Further considerations are given in BSI (1981a).</b>	1981a; Informative; GEO2:5930-5; Text in BS5930:1999+A1:2010 (cl 20.3) paraphrases the equivalent text in BS5930:1981 (cl 18.3) almost verbatim.	3a
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-6	83	18.6 MECHANICAL AUGERS Mechanical augers, comprising a continuous-flight auger and a hollow stern, are suitable for augering soft cohesive soils and may be suitable for firm cohesive soils. They are of limited use in soils with boulders or cores tones and are therefore seldom used in Hong Kong. <b>Further considerations are given in BSI (1981a).</b>	1981a; Informative; GEO2:5930-6; Text in BS5930:1999+A1:2010 (cl 20.6) paraphrases the equivalent text in BS5930:1981 (cl 18.6) almost verbatim.	3a

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	N/A	GEO2:5930-7	136	23.4 STATIC-DYNAMIC PROBING The standard penetration test is rather insensitive in loose materials and is not truly relevant to cohesive soils. On the other hand, the cone penetrometer is of limited use when dense or stiff layers are encountered. The static-dynamic test combines the two methods (Sherwood & Child, 1974); <b>this technique is further discussed in BSI (1981a).</b>	1981a; Informative; GEO2:5930-7; Static-dynamic probing is discussed in cl 23.4 of BS5930:1981. It does not appear in subsequent revisions. The test method is therefore no longer supported by a current standard. In the context of this clause the citation can be removed without detracting from the sense.	2
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-8	144	In cl 25.2 GROUNDWATER CONDITIONS <b>The three types of groundwater conditions may be recognized by the test response (BSI, 1981a) .</b>	1981a; Informative; GEO2:5930-8; The citation can be linked to cl 25.2 and Figure 14. The same text and illustration are provided in BS5930:1999+A2:2010 in cl 27.2 and Figure 11.	3a
Revised, Withdrawn	BS EN ISO 22282-4:2012	GEO2:5930-9	147	In cl 25.7 ANALYSIS OF RESULTS: The simpler form of analysis is the steady state type, but the necessary duration of pumping can be significantly longer than that necessary for nonsteady state analysis. The analysis technique is also dependent on aquifer response, i.e. whether confined or unconfined conditions are present. <b>A summary of some of the available analysis techniques is given in BSI (1981a),</b> and these are further discussed by Johnson (1982) and Kruseman & DeRidder (1980).	1981a; Informative; GEO2:5930-9; Pumping test analysis is described in cl 26 of BS5930:1981 with similar text appearing in cl 28 of BS5930:1999+A2:2010. Details are also contained in BS EN ISO 22282-4:2012, which should be cited as the most recent publication.	4a
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-10	156	In cl 28.2 STRESS MEASUREMENTS IN ROCK: <b>Special methods for measuring and interpreting the uniaxial, biaxial or triaxial state of stress in a rock mass are described in BSI (1981a).</b>	1981a; Informative; GEO2:5930-10; The guidance in BS5930:1981 is contained in cl 28. Up to date guidance on the same topics is contained in BS5930:1999+A2:2010 cl 30.2.	3a
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-11	161	In cl 29.1.4 Test Arrangement: <b>A comparable arrangement for performing the test in an adit is given in BSI (1981a).</b>	1981a; Informative; GEO2:5930-11; BS5930:1999+A2:2010 Figure 15 reproduces BS5930:1981 Figure 18, which contains an illustration of a bearing test in an adit. There is no other information specific to adits.	3a
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-12	191	Laboratory tests on rock material are undertaken to determine classification, strength and deformation parameters. Tests to determine the basic shear strength of specific discontinuities may also be undertaken. Table 13 lists the range of common laboratory tests on rock, together with references and remarks on their use. <b>Some of these tests are reviewed in</b> the Geotechnical Manual for Slopes (GCO, 1984) and <b>BSI (1981a).</b> The significance of the size and quality of the sample, the test conditions and the relevance of the results, as discussed in Chapter 37 for soils, also apply in general to tests on rock.	1981a; Informative; GEO2:5930-12; Table 11 in BS5930:1999+A2:2010 provides NCC information of various tests on rock material. BS EN 1997-2:2007 provides guidance on classification testing, swelling testing and strength testing of rock, both in the text (cl 5.12, 5.13 and 5.14) and in informative annexes (T, U, V and W). The citation should be updated to BS5930:1999+A2:2010 because it provides a greater range of tests and references to testing standards whilst containing all the tests listed in BS EN 1997-2:2007. Effectively BS5930:1999+A2:2012 provides all the normative information from BS EN 1997-2:2007 plus NCCI.	3a
Revised, Withdrawn	BS1377-9:1990, BS EN ISO 22475-1:2006, BS EN ISO 22476-2:2005+A1:2011, BS EN ISO 22282-2:2012, BS EN ISO 22282-3:2012, BS EN ISO 22282-4:2012, BS EN ISO 22282-5:2012, BS EN ISO 22282-6:2012	GEO2:5930-13	195	The essential requirement of a field report is that it should contain all the data necessary for the subsequent interpretation and use of the borehole or field test. Field report forms should be easy to fill in and well laid out so as to encourage the operator or field supervisor to record all necessary data. Such forms can in many cases be based upon the illustrative logs contained in this Geoguide, but these need not be regarded as standard as other forms may also be satisfactory. <b>Examples of other field report forms can be found in BSI (1981a) .</b>	1981a; Informative; GEO2:5930-13; There are no field report forms presented in BS5930:1999+A2:2010. Some forms for in-situ tests are contained in BS1377-9:1990 and the appropriate parts of BS EN ISO 22476 and BS EN ISO 22282:2012. Not all field test standards include examples of forms.	3a
Revised, Withdrawn	BS EN ISO 22475-1:2006	GEO2:5930-14	234	Note 2 at the foot of <i>Table 5 - Sizes of Commonly-used Core-barrels, Casings and Drill Rods Used in Hong Kong</i> states: For additional information, reference can be made to BS 4019:Part 1 (BSI, 1974a) on rotary core drilling equipment and <b>Figure 29 of BS 5930 (BSI, 1981a) .</b>	1981a; Informative; GEO2:5930-14; The information on core barrel sizes that is contained in Figure 29 of BS5930:1981 is referenced to BS4019-1:1974. It is no longer presented in BS5930:1999+A2:2010. Latest full information on core barrel sizes is presented in Annex C of BS EN ISO 22475-1:2006. This new reference should replace the citation of BS5930:1981.	4b
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-15	235	Footnote to Table 7 - Mass of Soil Required for Various Laboratory Tests states <b>"Note: Table taken from BS5930 (BSI, 1981a)"</b>	1981a; Informative; GEO2:5930-15; Table 3 in BS5930:1999+A2:2010 provides the same information. The reference should be updated accordingly.	3a
Revised, Withdrawn	BS EN 1997-2:2007	GEO2:5930-16	237	Notes after <i>Table 9 - Soil Sample Quality Classification</i> state: (1) Large diameter class 1 and class 2 samples are often sufficient to allow the 'fabric' of the soil to be examined. Sometimes this may also be done using class 3 and class 4 samples. (2) Remoulded properties can be obtained using class 1 to class 4 samples. (3) <b>Table taken from BS 5930 (BSI, 1981a) .</b>	1981a; Informative; GEO2:5930-16; The information in the table is consistent with BS EN 1997-2. Change reference and amend citation. 'Table adapted from BS EN 1997-2'.	4b
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-17	270	Footnote to <i>Figure 20 - Typical Twin-tube Closed-hydraulic Piezometer Tips</i> states: Figures based on BS 5930 (BSI,1981a) and Penman (1986)	1981a; Informative; GEO2:5930-17; The original drawing is in Figure 6 of BS5930:1981. A similar figure (Figure 5) appears in BS5930:1999+A2:2010.	3a

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-18	278	Note 1 at foot of <i>Figure 28 - Intake Factors (F) in Borehole Permeability Tests</i> states: Expressions come from Hvorslev (1951); figure based on BS 5930 (BSI, 1981a).	1981a; Normative; GEO2:5930-18; The original drawing is in Figure 7 of BS5930:1981. The same figure appears in BS5930:1999+A2:2010 (Figure 6). The normative standard for borehole permeability tests is EN 22282-2:2012. Intake factors, however, are provided by BS EN ISO 22282-1:2012, with only limited examples. Therefore the figure in Geoguide 2 can be retained and referenced to BS5930:1999+A2:2010 as NCCI.	3a
Revised, Withdrawn	BS EN ISO 22476-1:2012	GEO2:5930-19	289	Note 1 at the foot of <i>Figure 39 - Electrical Cone Penetrometers</i> states: (a) after BS5930 (BSI, 1981a), (b) & (c) after Delft Soil Mechanics Laboratory (1977).	1981a; Informative; GEO2:5930-19; The Geoguide 2 figure is based on Figure 12b in BS5930:1981. This figure does not appear in BS5930:1999+A2:2010, however a similar figure does appear in BS1377-9:1990 (Figure 8). Unfortunately cl3 of BS1377-9:1990 has been superseded by the normative standard for CPT; BS EN ISO 22476-1:2012. The new standard contains a similar figures, but more schematic. The example figure in Geoguide 2 can be seen as a combination of the figures in BS EN ISO 22476-1:2012.	4a
Revised, Withdrawn	BS5930:1999+A2:2010	GEO2:5930-20	293	Note at foot of <i>Figure 43 - Typical Arrangement for Plate Load Test</i> states: Figure adopted from Brown (1981) and BS 5930 (BSI, 1981a).	1981a; Informative; GEO2:5930-20; The Geoguide 2 figure is loosely based on Figure 18a of BS5930:1981. The same figure appears in BS5930:1999+A2:2010 (Figure 15a). This is NCCI to BS EN 1997-1:2004. The normative reference of plate loading test will be BS EN ISO 22476-13, which has yet to be published.	3a
<b>BS6031:1981 Code of Practice for Earthworks</b>						
Current, Obsolescent, Revised, Under review	BS6031:2009	GEO2:6031-2	19	This Geoguide deals with the investigation of sites in Hong Kong for the purposes of assessing their suitability for civil engineering and building works, and of acquiring knowledge of site characteristics that affect the design and construction of such works and the security of adjacent properties. It is essentially BS 5930 1981, Code of Practice for Site Investigations (BSI, 1981a), modified as considered desirable for use in Hong Kong. While the basic structure and philosophy of BSI (1981a) has been maintained in this Geoguide, topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience. Other sections of BSI (1981a) have been repeated herein without significant amendment, and this has been denoted by an italic script. Less relevant or rarely-used portions of BSI (1981a) have been incorporated only by reference, or have been specifically deleted. In this Geoguide, as in BSI (1981a), the expression "site investigation" has been used in its wider sense. It is often used elsewhere in a narrow sense to describe what has been termed herein "ground investigation". <b>The use of soil and rock as construction materials is treated only briefly; further information on this is given in BSI (1981 b).</b>	1981b; Informative; GEO2:6031-2; BS6031:1981 has been significantly updated and revised to be reissued as BS6031:2009. The new revision includes extensive sections on using ground data for selection of materials and design.	3a
Current, Obsolescent, Revised, Under review	BS6031:2009	GEO2:6031-3	44	In the case of slope failure, or where such failure is considered imminent, it is common practice to monitor movements both of the surface and underground. The former is conducted by conventional survey methods and the latter by means of slip indicators or inclinometer measurements. These techniques are fully described in <b>BSI (1981b)</b> and in the Geotechnical Manual for Slopes (GCO, 1984). It is also usually necessary to monitor groundwater pressures within the various underlying zones (see Chapter 20).	1981b; Informative; GEO2:6031-3; Neither BS6031:1981 nor BS6031:2009 fully describe slip indicators and inclinometers. The reference is therefore only marginally valid. Given the lack of information in the reference, the citation should be removed.	2
Current, Obsolescent, Revised, Under review	BS6031:2009	GEO2:6031-4	171	31.2 METHODS OF INSTRUMENTATION Several techniques can be used in ground investigation to monitor displacements and strains associated with known or suspected ground movements resulting from slope failures, foundation displacement, subsidence and ground response in large-scale field trials (BGS, 1973; Brown, 1981; <b>BSI, 1981b</b> ; GCO, 1984; Hanna, 1985). A review of instruments commonly used in Hong Kong is given by Coleman (1984). Handfelt et al (1987) have described the performance of the instrumentation used in an offshore test fill (see also Foott et al, 1987).	1981b; Informative; GEO2:6031-4; Monitoring of slopes is covered by cl 6 of BS6031:1981. This is virtually reproduced in BS6031:2009 cl 10.1.3. It is therefore reasonable to update the reference and citation.	3a
Current, Obsolescent, Revised, Under review	BS6031:2009	GEO2:6031-5	172	Compaction trials can include experiments with variable borrow materials, layer thicknesses, amounts of watering and amounts of work performed in compaction. Measurements should be made of insitu density and water content; the results should be compared with those from laboratory compaction tests, to obtain a specification standard, and with insitu borrow pit densities, so that the degree of bulking or volume reduction can be estimated for given quantities ( <b>BSI, 1981b</b> ). Trials of equipment can also be undertaken. Care should be taken not to vary too many factors at the same time, otherwise the effects of variation of an individual factor cannot be estimated.	1981b; Informative; GEO2:6031-5; Minor text in BS6031:1981 is largely paraphrased in BS6031:2009. Update reference to BS6031:2009.	3a

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Current, Obsolescent, Revised, Under review	BS6031:2009	GEO2:6031-6	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; <b>1981b</b> ; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1981b; Informative; GEO2:6031-6; Discussion, guidance and advice on analysis of stability is prevalent throughout BS6031:1981. Similar advice, although in terms of partial factors, is included in BS6031:2009.	3a
<b>BS8004:1986 Code of Practice for Foundations</b>						
Superseded, Withdrawn, but contains NCCI	BS8004:1986	GEO2:8004-2	50	10.3.3 Foundations for Structures Most structures in Hong Kong are founded on piles. Hand-dug caissons, driven piles, machine-bored piles and barrettes are commonly used. A general approach to planning a ground investigation suitable for pile design purposes is given in ICE (1978). The investigation should make a full appraisal of the site and the ground conditions should be investigated at depths well below the proposed pile toe level to allow for variations in the pile design. Knowledge of the groundwater conditions is also required. <b>Further advice on ground investigation for foundations is given in Section 10.7.2, BSI (1986) and Weltman &amp; Head (1983).</b>	1986; Informative; GEO2:8004-2; Although BS8004 has been withdrawn, in accordance with UK NA, it is one of the documents containing NCCI to BS EN 1997. However the clause number stated is incorrect; there is no clause 10.7.2 in BS8004:1986. It is assumed that the clause should be 7.2.1 Ground Investigations (for piles). Given teh context of teh citation the reference can be retained.	1
Superseded, Withdrawn, but contains NCCI	BS8004:1986	GEO2:8004-3	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; <b>1986</b> ) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1986; Informative; GEO2:8004-3; Although BS8004 has been withdrawn, in accordance with UK NA, it is one of the documents containing NCCI to BS EN 1997. Given the context of the citation, it can be retained unchanged.	1
Superseded, Withdrawn, but contains NCCI	BS8004:1986	GEO2:8004-4	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Resistivity, remarks.	1986; Informative; GEO2:8004-4; Although BS8004 has been withdrawn, in accordance with UK NA, it is one of the documents containing NCCI to BS EN 1997.The discussion of steel corrosion is part of the NCCI in BS8004:1986, therefore the reference can be retained.	1
<b>BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes</b>						
Revised, Withdrawn	Geospec3	GEO2:1377-2	65	13.2 INVESTIGATION OF POTENTIAL DETERIORATION OF CONCRETE <b>Laboratory tests to assess the aggressiveness of the ground and groundwater against Portland cement concrete include determination of pH value and sulphate content (BSI, 1975b).</b> Reference should be made to BRE (1981) regarding the determination of water-soluble sulphate concentrations. The pH value may be altered if there is a delay between sampling and testing, so field determinations should be made if possible.	1975b; Informative; GEO2:1377-2; Geospec 3 is the current local technical guidance document providing guidance on laboratory tests for determination of pH value and sulphate content of soil/groundwater.	4a
Revised, Withdrawn	BS1377:1990 Parts 2 to 7, Geospec3	GEO2:1377-3	90	BSI ( <b>1975b</b> ; 1975c) give precise details of the mass of soil sample required for each type of test. Where the approximate number of tests is known, it is a simple matter to estimate the total amount of soil that has to be obtained. If the programme of laboratory tests is uncertain, Table 7 gives some guidance on the amount of soil that should be obtained for each series of tests. Where materials for mineral aggregates, sands and filters are being considered, details of the size of sample required are given in BSI (1975a).	1975b; Informative; GEO2:1377-3; The citation can be updated to refer to BS1377:1999 Parts 2, 3, 4, 5, 6, 7 and Geospec3.	4b
Revised, Withdrawn	BS EN ISO 22476-3:2005+A1:2011	GEO2:1377-4	93	19.4.5 Split Barrel Standard Penetration Test Sampler <b>The split barrel sampler is used in the standard penetration test and is described in Test 19 of BSI (1975b).</b> It takes samples 35 mm in diameter and has an area ratio of about 100%. It is used to recover small samples, particularly under conditions which prevent the use of the general purpose 100 mm sampler, and gives class 3 or class 4 samples (see Section 21.2 and Figure 25).	1975b; Informative; GEO2:1377-4; Update reference to BS EN ISO 22476-3:2005+A1:2011 and amend text by deleting 'Test 19 of'.	4b
Revised, Withdrawn	BS EN ISO 22476-3:2005+A1:2011	GEO2:1377-5	111	The standard penetration test is a frequently used dynamic penetration test and is described in Test 19 of BSI (1975b).	1975b; Informative; GEO2:1377-5; Update reference to BS EN ISO 22476-3:2005+A1:2011 and amend text by deleting 'Test 19 of'.	4b



Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	BS EN ISO 22476-3:2005+A1:2011	GEO2:1377-6	111	It is important that the test is carried out precisely as described in Test 19 of BSI (1975b), except that the following modifications should be incorporated: (a) An automatic release trip hammer (Plate 7B) should be used to drive the sampler. (b) The weight of the hammer in the drive assembly should be 63.5 kg. (c) The diameter of the borehole should be between 60 mm and 200 mm. (d) Drill rods with a stiffness equal to or greater than type BW rods should be used to reduce energy dissipation. These modifications bring the test procedures into conformity with the proposed international standardization of the test (ISSMFE, 1977).	1975b; Normative; GEO2:1377-6; Items a and b in the list of modifications to the BS1377:1975 Test 19 given in Geoguide 2 have been incorporated in the current standard; BS EN ISO 22746-3:2005+A1:2011. The standard remains silent on Item c in the list and permits AW rods to be used in boreholes less than 20m deep. The standard requires the energy ratio of the drive hammer to be measured, certified and reported; it is not a previous requirement. This would mean all hammers having to be recalibrated, which does not reflect the current Hong Kong requirement. The execution of the test, however, remains unchanged in the BS EN standard.	5
Revised, Withdrawn	BS EN ISO 22476-3:2005+A1:2011	GEO2:1377-7	112	When the test is carried out in granular soils below groundwater level, the soil may become loosened, <b>even when the test is carried out in strict accordance with BSI (1975b)</b> and the borehole has been properly prepared. In certain circumstances, it can be useful to continue driving the sampler beyond the distance specified, adding further drill rods as necessary. Although this is not a standard penetration test, and should not be regarded as such, it may, at least, give an indication as to whether the deposit is really as loose as the standard test may indicate. When there is good reason to believe that unrealistically low values are being recorded, consideration should be given to the use of some other test which can be performed independently of a borehole, e.g. the cone penetration test described in Section 23.3.	1975b; Informative; GEO2:1377-7; Update reference to BS EN ISO 22476-3:2005+A1:2011.	4a
Revised, Withdrawn	BS1377-9:1990	GEO2:1377-8	113	A cruciform vane on the end of a solid rod is forced into the soil and then rotated (Figure 26). The torque required to rotate the vane can be related to the shear strength of the soil. <b>The method of carrying out the test is described in Test 18 of BSI (1975b)</b> . Vanes can take the form of borehole vanes or penetration vanes, the latter being much more reliable. The test can be extended to measure the remoulded strength of the soil. This is done by turning the vane through ten complete rotations. A pause of not more than one minute is permitted to elapse and the vane test is then repeated in the normal way. The degree of disturbance caused by rotating the vane differs from that obtained by remoulding a sample of clay in the laboratory, and the numerical value of the sensitivity of the clay determined by these procedures is not strictly comparable with the results obtained from laboratory triaxial tests.	1975b; Normative; GEO2:1377-8; The current standard for this test is cl 4.4 of BS1377-9:1990. The reference should be updated. However, we note that standard is due to change to BS EN ISO 22476-9.	3b
Revised, Withdrawn	BS1377-9:1990	GEO2:1377-9	114	With the penetration vane test apparatus (vane borer) <b>described in Test 18 of BSI (1975b)</b> , the vane and a protective casing (Plate 8) are forced into the ground by jacking. At the required depth, the vane is advanced a short distance ahead of the protective casing, the test is conducted, and the casing and vane are then subsequently advanced to the next required depth. However, with this type of test it is not always possible to penetrate to the desired layer without the assistance of pre-boring.	1975b; Informative; GEO2:1377-9; The current standard for this test is cl 4.4 of BS1377-9:1990. The reference should be updated. However, we note that standard is due to change to BS EN ISO 22476-9.	3b
Revised, Withdrawn	Geospec3	GEO2:1377-10	151	The methods described generally measure bulk density, and representative moisture contents are required if the dry density is to be calculated. Ideally, the weight of the moisture content sample should be determined on site, then the sample should be transported to the laboratory for <b>oven drying in accordance with BSI (1975b), Test 1A</b> . Otherwise, the entire sample has to be preserved in an airtight container until it can be weighed. Alternatively, a rapid determination of moisture content can be made using a microwave oven, the 'Speedy' moisture tester, or one of the rapid methods described in BSI (1975b), Test 1. However, all such rapid determinations should be thoroughly correlated with the standard oven-drying technique for the particular soil type being tested. In any case, moisture content samples should be as representative and as large as practical, or several determinations should be made in order to obtain a reliable mean value.	1975b; Normative; GEO2:1377-10; The cited test has been superseded in Hong Kong practice by Geospec3. Update reference to Geospec3. Clause 5 applies.	4b
Revised, Withdrawn	BS1377-2:1990	GEO2:1377-11	151	The methods described generally measure bulk density, and representative moisture contents are required if the dry density is to be calculated. Ideally, the weight of the moisture content sample should be determined on site, then the sample should be transported to the laboratory for oven drying in accordance with BSI (1975b), Test 1A. Otherwise, the entire sample has to be preserved in an airtight container until it can be weighed. <b>Alternatively, a rapid determination of moisture content can be made using a microwave oven, the 'Speedy' moisture tester, or one of the rapid methods described in BSI (1975b), Test 1</b> . However, all such rapid determinations should be thoroughly correlated with the standard oven-drying technique for the particular soil type being tested. In any case, moisture content samples should be as representative and as large as practical, or several determinations should be made in order to obtain a reliable mean value.	1975b; Normative; GEO2:1377-11; The rapid methods described in BS1377:1975 are the sand bath method and the alcohol method. No standard is quoted for the microwave oven method or the 'Speedy' moisture tester. Alternative determination methods were described in BS1924-2:1990 (the sand bath method, the microwave oven method and the calcium carbide method) however this standard was withdrawn in August 2013 with no replacement. It is recommended that only tests with recognised methods be included in the Geoguide. There are no equivalent tests in BS1377-2:1990 or Geospec3, however, BS1377-2:1990 gives some general guidance. It is noted that a microwave oven method is also described in the General Specification for Civil Engineering Works, Volume 1, Appendix 6.2.	3b
Revised, Withdrawn	BS1377-9:1990, Geospec3	GEO2:1377-12	151	With the exception of the water replacement method for rock fill (see Section 27.8), <b>the methods outlined below are described further in Test 15 of BSI (1975b)</b> or the ASTM standards quoted.	1975b; Informative; GEO2:1377-12; Test 15 of BS1377:1975 is the determination of in-situ dry density of soil. Six methods are permitted. Current Hong Kong practice (as set out in Geospec3) specifies three methods, of which two are based on the BS1377 methods.	4a

**Table D1 - Summary of Current British Standard References and Replacement Eurocodes**

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	Geospec3	GEO2:1377-13	151	27.2 SAND REPLACEMENT METHOD <b>BSI (1975b) describes three variations on the sand replacement method.</b> The first, employing a small pouring cylinder, is used for fine and medium grained soils, <b>as defined in BSI (1975b)</b> . The second, using a large pouring cylinder, is suitable for fine, medium and coarse grained soils. The third, the scoop method, may be used for fine, medium and coarse grained soils, but it is less precise than the first two and yields less reliable results; its use should be restricted to occasions where no pouring cylinder is available.	1975b; Normative; GEO2:1377-13; The current standard is Geospec3, but this only contains two sand replacement tests, not three. Scoop method is no longer valid and would need to be deleted. The text 'as defined in BSI(1975b)' can also be deleted in the redrafting of the paragraph.	4b
Revised, Withdrawn	BS1377-9:1990	GEO2:1377-14	152	27.3 CORE CUTTER METHOD The core cutter method is described in <b>BSI (1975b)</b> . The method depends upon being able to drive a cylindrical cutter into the soil without significant change of density and to retain the sample inside it so that the known internal volume of the cylinder is completely filled. It is therefore restricted to fine soils that are sufficiently cohesive for the sample not to fall out, and to completely decomposed rock free of large fragments. The method is generally less accurate than the sand replacement method because driving the sampler tends to alter the density of the soil.	1975b; Informative; GEO2:1377-14; Although not described in Geospec3, the core cutter method is described in BS1377-9:1990 cl 2.4.	3a
Revised, Withdrawn	BS1377-2:1990	GEO2:1377-15	152	27.4 WEIGHT IN WATER METHOD The weight in water method is described in <b>BSI (1975b)</b> . It is applicable to any soil where representative samples occur in discrete lumps that will not disintegrate during handling and submersion in water. In practice the method is restricted mainly to cohesive soils.	1975b; Normative; GEO2:1377-15; The heading for this method appears incorrect. BS1377:1975 gives the immersion in water method. Although not described in Geospec3, the immersion in water method is described in BS1377-2:1990 cl 7.3. If the method is retained then the reference requires updating. The heading should also be corrected.	3b
Revised, Withdrawn	BS1377-2:1990	GEO2:1377-16	152	27.5 WATER DISPLACEMENT METHOD The water displacement method is described in <b>BSI (1975b)</b> . It is an alternative to the weight in water method and has the same limitations.	1975b; Normative; GEO2:1377-16; Although not described in Geospec3, the water displacement method is described in BS1377-2:1990 cl 7.4. If the method is retained then the reference requires updating. The term 'weight in water' will also need to be changed to 'immersion in water'.	3b
Revised, Withdrawn	BS1377-9:1990	GEO2:1377-17	165	29.4.2 Test Method The test is carried out by the method described in <b>Test 16 of BSI (1975b)</b> excluding the compaction, and subject only to those alterations necessary to enable it to be carried out in the field. The load is generally applied through a screw jack using the weight of a vehicle as jacking resistance, and deflections are measured by dial gauges carried on a bridge with independent foundations resting on the ground well clear of the test area. A circular area of about 100 mm diameter is trimmed flat, special care being taken with the central area on which the plunger will bear. A thin layer of fine sand may be used to seat the plate but the use of sand to seat the plunger itself should be avoided. If it is impossible to trim the soil sufficiently to obtain good seating of the plunger, a thin layer of plaster of paris may be used, care being taken to remove any plaster extending beyond the area of the plunger. Further details of the insitu test are given elsewhere (Road Research Laboratory, 1952).	1975b; Normative; GEO2:1377-17; The text is describing the conduct of an in-situ CBR test. The procedure for carrying out in-situ CBR tests was not contained in BS1377:1975. Consequently the text refers to the laboratory CBR test and adds modifications. The test is now covered by BS1377-9:1990 cl 4.3. The reference should updated and the text revised appropriately.	3b
Revised, Withdrawn	BS1377:1990 Parts 1 to 7, Geospec3	GEO2:1377-18	183	A thorough discussion of laboratory testing is beyond the scope of this Geoguide. However, some basic aspects are briefly reviewed in Chapters 35 to 38 as laboratory testing is considered to be a part of the ground investigation, and the overall site investigation would normally not be complete without it. Further guidance on laboratory testing of rocks and soils is given in Brown (1981) and <b>BSI (1975b)</b> respectively. The Geotechnical Manual for Slopes (GCO, 1984) discusses the testing of Hong Kong rocks and soils in particular. Guidance on the description and classification of Hong Kong rocks and soils is given in Geoguide 3 (GCO, 1988).	1975b; Informative; GEO2:1377-18; Update reference to Geospec3 and BS1377:1990 Parts 1 to 7. (The sentence could also be redrafted so that the citation of Brown (1981) follows immediately after 'rocks' and the new citations follow 'soils', although this is not imperative.)	4a
Revised, Withdrawn	Geospec3	GEO2:1377-19	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Moisture content, recommended reference.	1975b; Normative; GEO2:1377-19; Update reference to Geospec3. (Cl 5 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-20	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Liquid and plastic limits, recommended reference.	1975b; Normative; GEO2:1377-20; Update reference to Geospec3. (Cl 6 applies).	4b
Revised, Withdrawn	BS1377-2:1990	GEO2:1377-21	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Linear shrinkage, recommended references.	1975b; Normative; GEO2:1377-21; Update reference to BS1377-2:1990 and change test number to cl 6.5.	3b
Revised, Withdrawn	Geospec3	GEO2:1377-22	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Specific gravity, recommended references.	1975b; Normative; GEO2:1377-22; Update reference to Geospec3. (Cl 7 applies). NB Test is now referred to as Particle Density.	4b
Revised, Withdrawn	Geospec3	GEO2:1377-23	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Particle size distribution by wet sieving, recommended reference.	1975b; Normative; GEO2:1377-23; Update reference to Geospec3. (Cl 8 applies).	4b
Revised, Withdrawn	BS1377-2:1990	GEO2:1377-24	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Particle size distribution by wet sieving, remarks, 1st instance.	1975b; Normative; GEO2:1377-24; The text states that tests must not be carried out using Method 7B of BS1377:1975. All PSD determination is now covered by Geospec3, which does not contain the equivalent method to Test 7B. Therefore the citation can be removed but the text requires revision.	2
Revised, Withdrawn	Geospec3	GEO2:1377-25	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Particle size distribution by wet sieving, remarks, 2nd instance.	1975b; Normative; GEO2:1377-25; Revision of the text to remove GEO2:1377-24 will render this citation superfluous. It should therefore be removed.	2
Revised, Withdrawn	Geospec3	GEO2:1377-26	240	See Table 12 - Test on Soils & Groundwater (Sheet 1 of 4), Particle size distribution by sedimentation, recommended reference.	1975b; Normative; GEO2:1377-26; Update reference to Geospec3. (Cl 8 applies).	4b

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	Geospec3	GEO2:1377-27	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Organic matter content, recommended references.	1975b; Normative; GEO2:1377-27; Update reference to Geospec3. (Cl 9 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-28	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Sulphate content, recommended references, 1st citation.	1975b; Normative; GEO2:1377-28; Update reference to Geospec3. (Cl 9.3 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-29	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Sulphate content, remarks.	1975b; Normative; GEO2:1377-29; Update reference to Geospec3. (Cl 9.3 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-30	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Sulphate content, recommended references, 2nd citation.	1975b; Normative; GEO2:1377-30; Update reference to Geospec3. (Cl 9.3 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-31	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). pH, recommended references.	1975b; Normative; GEO2:1377-31; Update reference to Geospec3. (Cl 9.5 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-32	242	See Table 12 - Test on Soils & Groundwater (Sheet 3 of 4). Triaxial compression, recommended references.	1975b; Normative; GEO2:1377-32; Update reference to Geospec3. (Cl 15 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-33	242	See Table 12 - Test on Soils & Groundwater (Sheet 3 of 4). Consolidation, recommended references.	1975b; Normative; GEO2:1377-33; Update reference to Geospec3. (Cl 14 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-34	243	See Table 12 - Test on Soils & Groundwater (Sheet 4 of 4). Dry density/moisture content relationship, recommended references.	1975b; Normative; GEO2:1377-34; Update reference to Geospec3. (Cl 10 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-35	243	See Table 12 - Test on Soils & Groundwater (Sheet 4 of 4). Dry density/moisture content relationship, remarks.	1975b; Normative; GEO2:1377-35; Update reference to Geospec3. (Cl 11 applies).	4b
Revised, Withdrawn	Geospec3	GEO2:1377-36	243	See Table 12 - Test on Soils & Groundwater (Sheet 4 of 4). California bearing ratio, recommended references.	1975b; Normative; GEO2:1377-36; Update reference to Geospec3. (Cl 12 applies).	4b
Revised, Withdrawn	BS EN ISO 22476-3:2005+A1:2011	GEO2:1377-37	275	See footnote Figure 25 - Split Barrel Sampler for Standard Penetration Test	1975b; Normative; GEO2:1377-37; Update reference to BS EN ISO 22476-3:2005+A1:2011 Figure 1.	4a
Revised, Withdrawn	BS1377-9:1990	GEO2:1377-38	276	See footnote Figure 26 - Vane Shear Devices	1975b; Normative; GEO2:1377-38; Update reference to BS1377-9:1990 cl 4.4 and Figures 16, 17 and 18.	3a
<b>CP 1021:1973 Cathodic Protection</b>						
Superseded, Withdrawn	BS7361-1:1991	GEO2:1021-2	65	<p>13.3 INVESTIGATION OF POTENTIAL CORROSION OF STEEL</p> <p>The likelihood of corrosion of steel can be assessed from tests of resistivity, redox potential, pH, chloride ion content, total sulphate content, sulphate ion content, and total sulphide content. Details of these tests, and relevant limits for a relatively non-aggressive environment for steel, are given in the Model Specification for Reinforced Fill Structures (Brian-Boys et al, 1986). Chemical tests should be done on undisturbed specimens which have been placed in clean airsealed containers immediately after sampling. <b>If bacteriological attack is expected, undisturbed specimens should be placed in sterilized containers and tested in accordance with BSI (1973)</b> (see also Section 13.2 and Table 12).</p>	1973; Normative; GEO2:1021-2; CP1021 has been replaced by BS7361-1:1991, but this contains no actual recommendation on the nature of the bacteriological testing. CP1021 does, however, give some details of testing to be undertaken to assist in the assessment of the risk of microbial activity. Current advice in CIRIA C634 suggests that where microbial attack has already occurred, samples should be collected in an oxygen free environment. This would require highly specialist testing that is not routine. It can be inferred that the testing originally contained in CP1021:1973 refers to resistivity, redox and similar routine electro-chemical tests; but with samples collected and stored in sealed jars subject to strict special requirements. Such circumstances are considered rare and would merit highly specialist testing. Consequently the citation should be updated to BS1377:1990 which is the current standard for redox testing.	4a
Superseded, Withdrawn	No current guidance	GEO2:1021-3	202	<p>40.3 ENGINEERING INTERPRETATION</p> <p>40.3.1 Matters to be Covered</p> <p>Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; <b>1973</b>; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.</p>	1973; Informative; GEO2:1021-3; In the context of 40.3.1, ground information for engineering design of cathodic protection is now contained in BS7361-1:1991. The reference should be changed and citation updated accordingly.	4a
Superseded, Withdrawn	BS1377-9:1990	GEO2:1021-4	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Redox potential, remarks. The text states: Assesses the likelihood of sulphate reducing bacteria being present, which promote microbiological corrosion of buried steel. The quoted reference gives a test method for compacted fill. as opposed to field measurement, which is described in CP1021 (BSI, 1973)	1973; Informative; GEO2:1021-4; The current standard for the field testing for redox potential is set out in BS1377-9:1990 cl 5.2. This is referenced from the standard which replaced CP1021:1973; BS7361-1:1991. Consequently, it would be appropriate to amend the general reference for in-situ redox testing to BS1377-9:1990.	4a



Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Superseded, Withdrawn	N/A	GEO2:1021-5	241	See Table 12 - Test on Soils & Groundwater (Sheet 2 of 4). Bacteriological tests, recommended references.	1973; Normative; GEO2:1021-5; CP1021 :1973 referenced in Geoguide 2 does not contain guidance on bacteriological testing. Current BS is BS7361-1:1991, but this also contains no specification for bacteriological testing. Current guidance suggests that such testing would only be required in exceptional circumstances and would require significant specialist input. In the context of standards, the citation should be deleted.	2
BS1924:1975 Methods of Test for Stabilized Soils						
Revised, Withdrawn	BS1377-2:1990	GEO2:1924-2	90	BSI (1975b; 1975c) give precise details of the mass of soil sample required for each type of test. Where the approximate number of tests is known, it is a simple matter to estimate the total amount of soil that has to be obtained. If the programme of laboratory tests is uncertain, Table 7 gives some guidance on the amount of soil that should be obtained for each series of tests. Where materials for mineral aggregates, sands and filters are being considered, details of the size of sample required are given in BSI (1975a).	1975c; Informative; GEO2:1924-2; Reference would have been updated to BS1924-2:1990, however, this standard was withdrawn in August 2013 with no replacement. Instead reference is amended to BS1377-2:1990 which gives some general guidance.	3a
BS812:1975 Methods for Sampling and Testing of Mineral Aggregates, Sand and Fillers						
Superseded, Withdrawn	BS812:1990 (largely withdrawn), BS EN 932 (multiple parts), BS EN 933 (multiple parts) and BS EN 1097 (multiple parts)	GEO2:812-2	90	BSI (1975b; 1975c) give precise details of the mass of soil sample required for each type of test. Where the approximate number of tests is known, it is a simple matter to estimate the total amount of soil that has to be obtained. If the programme of laboratory tests is uncertain, Table 7 gives some guidance on the amount of soil that should be obtained for each series of tests. Where materials for mineral aggregates, sands and fillers are being considered, details of the size of sample required are given in BSI (1975a).	1975a; Informative; GEO2:812-2; BS812:1975 has been replaced by revised and updated BS812 (largely withdrawn, 13 parts current), BS EN 932 (5 parts), BS EN 933 (6 parts current, 5 parts due to be published) and BS EN 1097 (6 parts current, 4 parts due to be published). This large number of standards cannot be easily summarised. Given the recent issue of Construction Standard CS3 for use in Hong Kong, it is recommended that the BS citation be deleted and replaced by reference to CS3 instead.	5
Superseded, Withdrawn	BS812:1990 (largely withdrawn), BS EN 932 (multiple parts), BS EN 933 (multiple parts) and BS EN 1097 (multiple parts)	GEO2:812-3	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1975a; Informative; GEO2:812-3; The current standards covering aggregates are BS812 (largely withdrawn, 13 parts current), BS EN 932 (5 parts), BS EN 933 (6 parts current, 5 parts due to be published) and BS EN 1097 (6 parts current, 4 parts due to be published). This large number of standards cannot be easily summarised. Given that BS812:1975 was a test specification not containing specific 'guidance on analysis and application of ground data', but simply providing a test method, it is recommended that the BS citation in this case is simply deleted with no replacement as there are other more applicable standards referred to in this clause.	2
BS4019:1974 Specification for Core Drilling Equipment						
Revised, Withdrawn	BS EN ISO 22475-1:2006	GEO2:4019-2	95	19.8 ROTARY CORE SAMPLES Samples are obtained by the rotary core drilling procedures described in Section 18.7. The quality of sample may vary considerably depending on the character of the ground and the type of coring equipment used (BSI, 1974a).	1974a; Informative; GEO2:4019-2; BS4019-1:1974 is a material standard and contains no information on use of core barrels or the quality of samples produced. Consequently the citation does not support the preceding statement. Recommend deletion.	2
Revised, Withdrawn	BS EN ISO 22475-1:2006	GEO2:4019-3	234	Note 2 at the foot of Table 5 - Sizes of Commonly-used Core-barrels, Casings and Drill Rods Used in Hong Kong states: For additional information, reference can be made to BS 4019:Part 1 (BSI, 1974a) on rotary core drilling equipment and Figure 29 of BS 5930 (BSI, 1981a).	1974a; Informative; GEO2:4019-3; BS4019-1:1974 has been replaced by BS4019-3:1993 and BS4019-4:1993. However these are detailed material standards and of limited use to geotechnical engineers. All the relevant information from these standards is summarised in Annex C of BS EN ISO 22475-1:2006.	4b

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
<b>CP 1013:1965 Earthing</b>						
Superseded, Withdrawn	BS1377-9:1990	GEO2:1013-2	178	33.2.1 Resistivity This technique is used for investigating the simpler geological problems. <b>A current is usually passed into the ground through two metal electrodes, and the potential difference is measured between two similar electrodes (BSI, 1965).</b> With suitable deployment of the electrodes, the system may be used to provide information on the variation of geo-electrical properties with depth (depth probes), lateral changes in resistivity (constant separation traversing) or local anomalous areas (equipotential survey), e.g. karst features, disused tunnels or shafts. The unsuspected presence of electrical conductors, e.g. pipes or cables, under the site will, of course, render the results unreliable. The interpretation of the results obtained by this method does not always provide a definite solution. particularly as the number of subsurface layers increases, because it involves a curve matching technique which requires the assumption	1965; Informative; GEO2:1013-2; CP1013:1965 has been superseded by BS7430:2011. The current standard does not describe the in-situ test which precedes the citation. The test being described is a standard Wenner array. Such a test is described in BS1377-9:1990, which is current. BS7430:2011 gives no guidance on in-situ tests; it refers only to laboratory tests on soil samples to be done in accordance with BS1377-3:1990. To maintain the integrity of the text, it is recommended that the citation be changed and referred to BS1377-9:1990.	4a
Superseded, Withdrawn	BS7430:2011	GEO2:1013-3	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1965; Informative; GEO2:1013-3; In the context of 40.3.1, this reference provides very little information. It may be inferred from GEO2:1013-2 that CP1013:1965 contained a description of an in-situ resistivity test; something potentially relevant to earthing. However the current equivalent standard (BS7430:2011) only contains a recommendation for soil testing in the laboratory. Given that there is no specific advice on ground investigation for earthing in the current standard, it would seem appropriate to remove this citation.	2
<b>CP 2012:1974 Code of Practice for Foundations for Machinery</b>						
Confirmed, Current	N/A	GEO2:2012-2	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1974b; Informative; GEO2:2012-2; CP2012:1974 contains specific advice on ground investigations for foundations for reciprocating machinery (cl 3.3). This is not reproduced in any other standards. The citation should be retained.	1
<b>BS5493:1977 Code of Practice for Protective Coating on Iron and Steel Structures Against Corrosion</b>						
Current, Superseded	N/A	GEO2:5493-2	202	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	1977; Informative; GEO2:5493-2; The reference document has been replaced by eleven current standards. It is unlikely that these all contain significant advice on analysis and application of ground data. Given the non-specific nature of the clause, it is considered reasonable to delete this citation and the reference.	2
<b>BS5573:1978 Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes</b>						
Superseded, Withdrawn	BS8008:1996+A1:2008	GEO2:5573-2	358	(c) BS5573 : Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes (BSI, 1978). This describes the safety precautions that should be taken, the specific safety requirements for the equipment to be used, and the gas hazards which might be encountered in deep and large diameter boreholes.	1978; Informative; GEO2:5573-2; The cited reference was replaced in UK practice by BS8008:1996+A1:2008, which is itself recognised as NCCI to BS EN 1997-1:2004.	3b

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Reference Section of Report						
Superseded, Withdrawn	BS7430:2011	GEO2:1013-1	211	BSI (1965) Earthing (CP 1013:1965). British Standards Institution, London, 132 p.	1965; Reference; GEO2:1013-1; This reference has two informative citations. In cl 40.3.1 the citation is in a list of general references and is not supported by the current standard for earthing; so it may be deleted. In cl 33.2.1 the citation can be replaced by citing the current standard for the described in-situ test; BS1377-9:1990. Consequently this reference can be removed.	2
Superseded, Withdrawn	BS EN 13636:2004, BS EN 15112:2006	GEO2:1021-1	211	BSI (1973) Cathodic Protection (CP 1021:1973), British Standards Institution, London, 104 p.	1973; Reference; GEO2:1021-1; This reference has four citations; two normative and two informative. Both normative citations accompany text on bacteriological testing that is not supported by current standards and practice. These should be deleted. One informative citation (cl 40.3.1) is general and can be brought up to the current standards by reference to BS7361:1991. The other informative citation refers to in-situ testing for redox potential and can be brought up to date by reference to BS1377-9:1990. The reference can be deleted if the recommended changes are made.	4a
Revised, Withdrawn	BS 4019-3:1993+ISO 3551-1:1992, BS 4019-4:1993+ISO 3551-2:1992	GEO2:4019-1	211	BSI (1974a) Specification for Core Drilling Equipment (BS4019:1974). Part I - Basic Equipment. British Standards Institution, London, 152 p.	1974a; Reference; GEO2:4019-1; There are two informative citations for this reference; a footnote to Table 5 and a passing reference in cl 19.8. Both citations and the reference should be deleted. The information cited in Table 5 can be referenced to BS EN ISO 22475-1:2006. The other citation is not appropriate to the preceding text. The reference can be removed if the recommended changes are made.	4b
Confirmed, Current		GEO2:2012-1	211	BSI (1974b) Code of Practice for Foundations for Machinery (CP 2012:1974). Part I - Foundations for Reciprocating Machines. British Standards Institution, London, 36 p.	1974b; Reference; GEO2:2012-1; There is a single informative citation of this reference. The reference remains current and the citation is appropriate, therefore the reference should be retained.	1
Superseded, Withdrawn	BS812 (largely withdrawn, 13 parts current) BS EN 932 (5 parts) BS EN 933 (6 parts current, 5 parts due to be published) BS EN 1097 (6 parts current, 4 parts due to be published)	GEO2:812-1	211	BSI (1975a) Methods for Sampling and Testing of Mineral Aggregates. Sand and Filters (BS812:1975). Part I - Sampling. Size. Shape and Classification. British Standards Institution, London, 24 p.	1975a; Reference; GEO2:812-1; The reference has two informative citations. It has been replaced by revised and updated BS812 (largely withdrawn, 13 parts current), BS EN 932 (5 parts), BS EN 933 (6 parts current, 5 parts due to be published) and BS EN 1097 (6 parts current, 4 parts due to be published). Now replaced with recently issued CS3 standard for local Hong Kong use.	4b
Revised, Withdrawn	Geospec3, BS1377:1990, BS EN ISO 22476-3:2005+A1:2011, BS1924-2:1990	GEO2:1377-1	211	BSI (1975b). Methods of Test for Soil for civil Engineering Purposes (BS1377:1975), British Standards Institution, London, 144 p.	1975b; Reference; GEO2:1377-1; This reference has 37 citations (28 normative and 9 informative). It requires separation as its citations are now allocated to several other standards. The current reference needs updating to BS1377:1990 Parts 1-7 and 9 (separate entries), BS EN ISO 22476-3:2005+A1:2011 (SPT), BS1924-2:1990 and Geospec3.	3b
Revised, Withdrawn	BS1924-1:1990, BS1924-2:1990	GEO2:1924-1	211	BSI (1975c) Methods of Test for Stabilized soils (BS1924:1975), British Standards Institution, London, 96 p.	1975c; Reference; GEO2:1924-1; This reference has one informative citation. (Cl 19.2, §4). The reference, however, should be updated as it will also cover an update to several citations currently attributed to BS1377:1975 that are not covered by BS1377-9:1999 or Geospec3.	3b
Current, Superseded	BS EN ISO 12944-1:1998, BS EN ISO 12944-2:1998, BS EN ISO 12944-3:1998, BS EN ISO 12944-4:1998, BS EN ISO 12944-5:2007, BS EN ISO 12944-6:1998, BS EN ISO 12944-7:1998, BS EN ISO 12944-8:1998, BS EN ISO 14713-1:2009, BS EN ISO 14713-2:2009, BS EN ISO 14713-3:2009	GEO2:5493-1	211	BSI (1977) Code of Practice for Protective Coating of Iron and Steel Structures Against Corrosion (BS5493:1977). British Standards Institution, London, 112 p.	1977; Reference; GEO2:5493-1; 1977; Reference; GEO2:5493-1; The single informative citation to this reference occurs in cl 40.3.1 on p202. Current UK guidance on assessment and analysis of ground conditions in general is given in BS EN 1997-1:2004 and BS EN 1997-2:2007. These should be placed in cl 40.3.1 in place of this reference, and others, as they are deemed more relevant to analysis of ground data.	2

Table D1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Revised, Withdrawn	BS5930:1999+A2:2010, BS EN 1997-2:2007, BS EN ISO 22475-1:2006, BS EN ISO 22476-1:2012, BS EN ISO 22476-2:2005+A1:2011, BS EN ISO 22476-3:2005+A1:2011, BS EN ISO 22476-12:2009, BS EN ISO 22282-1:2012, BS EN ISO 22282-2:2012, BS EN ISO 22282-4:2012	GEO2:5930-1	211	BSI (1981a). Code of Practice for Site Investigations (BS5930:1981). British Standards Institution, London, 148 p.	1981a; Reference; GEO2:5930-1; This reference has 22 citations (6 historical, 15 informative and one normative). BS5930 is also mentioned three times in the Foreword, but without citation of a reference. The historical citations are to be largely retained. Normative and informative citations can be reassigned to BS5930:1999+A2:2010 or other standards documents, e.g. BS EN 1997-2:2007 and current investigation execution standards (BS EN ISO 22475-1:2006, BS EN ISO 22476-1:2012, BS EN ISO 22476-2:2005+A1:2011, BS EN ISO 22476-3:2005+A1:2011, BS EN ISO 22476-12:2009, BS EN ISO 22282-1:2012, BS EN ISO 22282-2:2012, BS EN ISO 22282-4:2012). Retention of historical citations requires retention of BS5930:1981 in the list of reference standards. 1981a in the citations should become 1981.	1



Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
Technical Clauses in Report					
<b>BS5930:1981 Code of Practice for Site Investigations</b>					
N/A	GEO2:5930-2a	3	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-2b	3	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-2c	3	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-3a	19	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-3b	19	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-3c	19	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-3d	19	1	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-3e	19	2	Descriptive historical reference to BS5930:1981.	No equivalent.
N/A	GEO2:5930-4	19	1	Descriptive historical reference to BS5930:1981.	No equivalent.
BS5930:1999+A2:2010	GEO2:5930-5	82	3a	<p><b>18.3 Headings (adits).</b> Headings are driven from the bottom of shafts or laterally into sloping ground, and can be used for the in situ examination of the strata, existing foundations and other underground constructions, and also for carrying out special sampling and in situ testing. One important use of headings is in the inspection of abutments of dams. In soil and many types of rock, the sides and roof of the heading require support.</p> <p>Driving a heading below the water table presents a construction problem in strata that are not naturally self-supporting during the period required to erect support timbers. Below the water table, it is probable that headings are an economical means of ground investigation expedient only in rock and stiff impermeable clay. In other cases, one of the methods described in section six of CP 2004 : 1972 may be suitable.</p>	<p><b>20.3 Headings (adits)</b></p> <p>Headings are driven from the bottom of shafts or laterally into sloping ground and can be used for the in-situ examination of the strata, existing foundations and other underground constructions, as well as for carrying out special sampling and in-situ testing. One important use of headings is in the inspection of abutments of dams. In soil and many types of rock, the sides and roof of the heading require support.</p> <p>Driving a heading below the water table presents a major construction problem in strata that are not naturally self-supporting during the period required to erect support elements. Below the water table, it is probable that headings are only an economical means of ground investigation in rock and stiff impermeable clay.</p>



Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
BS5930:1999+A2:2010	GEO2:5930-6	83	3a	<p><b>18.6 Mechanical augers.</b> Mechanical augers normally use a continuous-flight auger with a hollow stem; they are suitable for augering in cohesive soils. When augering, the hollow stem is closed at its lower end by a plug, which may be removed so that the sampler can be lowered down through the stem and driven into the soil below the auger bit. The use of hollow-stemmed augers in cohesionless soils often presents practical problems because it is difficult to prevent material from flowing into the hollow stem on removal of the plug. When rock is encountered, boring can be extended by core-drilling through the hollow stem. Typically, augers with hollow stems of approximately 75 mm and 125 mm diameter produce boreholes of about 150 mm and 250 mm diameter respectively, to a depth of 30 m to 50 m. Continuous-flight augering requires considerable mechanical power and weight so that the machine is generally mounted on a heavy vehicle. The debris from drilling is brought to the surface by auger flights, and gives only a very rough indication of the levels and character of the strata. A precise intermittent identification of the strata may be obtained from drive samples taken through the hollow stem of the auger.</p> <p>In self-supporting strata, solid rods and a suitable auger tool can be used, the auger tool being drawn up to the ground surface each time it has to be emptied. Drive sampling and testing can be carried out in the borehole.</p>	<p><b>20.6 Mechanical augers</b></p> <p>Mechanical augers for ground investigations normally use a continuous-flight auger with a hollow stem and these are suitable for augering in cohesive soils. When augering, the hollow stem is closed at its lower end by a plug, which may be removed so that the sampler can be lowered down through the stem and driven into the soil below the auger bit. The use of hollow-stemmed augers in cohesionless soils often presents practical problems because it may be difficult to prevent material from flowing into the hollow stem on removal of the plug. When rock is encountered, boring can be extended by core-drilling through the hollow stem. Typically, augers with hollow stems of approximately 75 mm and 125 mm diameter produce boreholes of about 150 mm and 250 mm diameter respectively, to a depth of 30 m to 50 m. Continuous-flight augering requires considerable mechanical power and weight so that the machine is therefore usually mounted on a heavy vehicle. The debris from drilling is brought to the surface by auger flights and gives only a very rough indication of the levels and character of the strata. A precise intermittent identification of the strata may be obtained from drive samples taken through the hollow stem of the auger.</p> <p>In self-supporting strata, solid rods and a suitable auger tool can be used, the auger tool being drawn up to the ground surface each time it has to be emptied. Drive sampling and testing can be carried out in the borehole.</p>
N/A	GEO2:5930-7	136	2	<p><b>23.4 Static-dynamic probing</b></p> <p><b>23.4.1 General.</b> The standard penetration test is rather insensitive in loose materials, is not truly relevant to cohesive soils and can give erroneous results when used below ground water level. On the other hand, the Dutch cone is frequently of limited use because it is unable to penetrate soils such as dense gravel. The static-dynamic test combines the two methods [50, 51].</p> <p><b>23.4.2 Equipment.</b> The penetrometer used is the Dutch cone shown in figure 11. In the static part of the test, the penetrometer is forced into the ground in the same way as in the Dutch cone test. In the dynamic part, the penetrometer and the sounding tube are driven into the ground by the same hammer falling through the same distance as for the standard penetration test. As the standard Dutch cone tube does not stand up well to the dynamic part of the test, 35 mm diameter high-quality steel tubes are used as sounding tubes, with standard inner sounding rods.</p> <p><b>23.4.3 Method.</b> The penetrometer is driven directly into the ground and the number of hammer blows (blow count) is recorded for each 75 mm of penetration. At intervals of 300 mm, a static test is carried out. The blow count for the increment in which static measurements are taken is somewhat reduced as for part of this increment the sounding tubes only are being driven. This blow count is usually disregarded, although it should be recorded in the field because it gives some indication of the effect of shaft friction on individual soundings. It is usual to end the test when a blow count of 50 blows per 75 mm is reached to avoid damage to the penetrometer, although it is possible to penetrate very thin layers of dense material with counts of up to 200 blows per 75 mm without excessive damage.</p> <p><b>23.4.4 Analysis of results.</b> The readings from the static test are interpreted in the same way as those from the Dutch cone test. The readings from the dynamic test are usually correlated with those from the static test on the same site. Alternatively, the readings from the dynamic test may be correlated with standard penetration test results obtained by sinking boreholes near the positions of static-dynamic tests and carrying out normal standard penetration tests within them.</p>	No equivalent.



Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
BS5930:1999+A2:2010	GEO2:5930-8	144	3a	<p><b>25.2 Ground water conditions.</b> There are two main types of ground water conditions, confined and unconfined, and these should be recognized for analytical and design purposes.</p> <p>(a) <i>Confined.</i> If the ground under investigation is fully saturated and the water is confined under pressure between two impermeable layers, then confined conditions are said to exist, see figure 13.</p> <p>(b) <i>Unconfined.</i> If the original phreatic level is everywhere below the upper surface of the aquifer, then unconfined conditions are said to exist, see figure 13.</p> <p>Intermediate between the above two ground water conditions is a third called the semi-confined condition. In this case, fully saturated ground is overlain by material of significant but lower permeability, and significant leakage takes place across the boundary in response to pumping. Analysis of data from semi-confined conditions is possible, but the condition is less commonly encountered than the other two types. The three types of ground water conditions may be recognized from the plots during testing by the way in which water or piezometric levels fall with respect to time in response to pumping, see figure 14.</p>	<p><b>27.2 Groundwater conditions</b> There are two main types of groundwater conditions: confined and unconfined; both of these should be recognized for analytical and design purposes.</p> <p>a) <b>Confined</b> If the ground under investigation is fully saturated and the water is confined under pressure between two impermeable layers, then confined conditions are said to exist (see Figure 10).</p> <p>b) <b>Unconfined</b> If the original phreatic level is everywhere below the upper surface of the aquifer, then unconfined conditions are said to exist (see Figure 10).</p> <p>Intermediate between the above two groundwater conditions is a third called the semi-confined condition. In this case fully saturated ground is overlaid by material of significant but lower permeability, and significant leakage takes place across the boundary in response to pumping. Analysis of data from semi-confined conditions is possible, but the condition is often not identified. The three types of groundwater conditions may be recognized from the plots during testing by the way in which water or piezometric levels fall with respect to time in response to pumping (see Figure 11).</p>
BS EN ISO 22282-4:2012	GEO2:5930-9	147	4a	BS5930:1981 cl 26.	Evaluation of pumping test data is covered by BS EN ISO 22282-4:2012 Annex C. Cl 28 of BS5930:1999+A2:2010 also contains NCCI on analysis of pumping test that is broadly the same as that in cl 26 of BS5930:1981.
BS5930:1999+A2:2010	GEO2:5930-10	156	3a	BS5930:1981 cl 28 gives extensive guidance on various in-situ stress measurement methods in rock.	BS5930:1999+A2:2010, cl 30.2 gives equivalent, up to date, guidance.
BS5930:1999+A2:2010	GEO2:5930-11	161	3a	Figure 18b in BS5930:1981.	Figure 15b in BS5930:1999+A2:2010 is identical.
BS5930:1999+A2:2010	GEO2:5930-12	191	3a	Table 5 in BS5930:1981	Table 11 in BS5930:1999+A2:2010 is equivalent. It contains all the tests listed in Table 5 of BS5930:1981 and some new tests.
BS1377-9:1990, BS EN ISO 22475-1:2006, BS EN ISO 22476-2:2005+A1:2011, BS EN ISO 22282-2:2012, BS EN ISO 22282-3:2012, BS EN ISO 22282-4:2012, BS EN ISO 22282-5:2012, BS EN ISO 22282-6:2012	GEO2:5930-13	195	3a	In BS5930:1981, example forms are provided in Figures, 20, 21, 22, 23, 24, 25 and 26.	Not all the field reports listed in BS5930:1981 are reproduced in current standards. Example forms are now either included in the standard specific to the field test or not at all.
BS EN ISO 22475-1:2006	GEO2:5930-14	234	4b	Figure 29 in BS5930:1981	Annex C of BS EN 22475-1:2006.
BS5930:1999+A2:2010	GEO2:5930-15	235	3a	Table 1 in BS5930:1981	Table 3 in BS5930:1999+A2:2010 contains identical information.
BS EN 1997-2:2007	GEO2:5930-16	237	4b	The information in Table 9 of Geoguide 2 comes directly from cl 19.2 of BS5930:1981.	Table 3.1 in BS EN 1997-2:2007 provides the same information.
BS5930:1999+A2:2010	GEO2:5930-17	270	3a	Figure 6 in BS 5930:1981	Figure 5 in BS 5930:1990+A2:2010
BS5930:1999+A2:2010	GEO2:5930-18	278	3a	Figure 7 in BS 5930:1981	Figure 6 in BS 5930:1999+A2:2010
BS EN ISO 22476-1:2012	GEO2:5930-19	289	4a	Figure 12b in BS5930:1981	Equivalent appears in Figure 1 of BS EN ISO 22476-1:2012.
BS5930:1999+A2:2010	GEO2:5930-20	293	3a	Figure 18a in BS 5930:1981	Figure 15a in BS 5930:1999+A2:2010
<b>BS6031:1981 Code of Practice for Earthworks</b>					
BS6031:2009	GEO2:6031-2	19	3a	BS6031:1981, particularly cl 7.2, cl 7.6 and Section 9.	BS6031:2009, particularly Section 8.
BS6031:2009	GEO2:6031-3	44	2	BS6031:1981, cl5.1.3.5.	BS6031:2009, cl 10.1.2.2.
BS6031:2009	GEO2:6031-4	171	3a	BS6031:1981, mainly covered by cl 6.	BS6031:2009, mainly covered by cl 10.1.3.

## Geoguide 2 - Guide to Site Investigation

Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
BS6031:2009	GEO2:6031-5	172	3a	BS6031:1981, minor text in cl 7.2.2 and cl 8.5.	BS6031:2009, minor text in cl 7.6.2.
BS6031:2009	GEO2:6031-6	202	3a	Throughout BS6031:1981.	Throughout BS6031:2009.
<b>BS8004:1986 Code of Practice for Foundations</b>					
BS8004:1986	GEO2:8004-2	50	1	Reference remains unchanged, but citation gives wrong clause number (10.7.2).	Reference remains unchanged, but clause should be corrected to 7.2.1.
BS8004:1986	GEO2:8004-3	202	1	Reference remains unchanged. General information.	Reference remains unchanged.
BS8004:1986	GEO2:8004-4	241	1	Reference remains unchanged. Information is mainly in Section 10 but other clauses also deal with corrosion.	Reference remains unchanged.
<b>BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes</b>					
Geospec3	GEO2:1377-2	65	4a	The cited standard does not address aggressiveness of the ground and groundwater against Portland cement, although it does prescribe some of the physical tests that have to be carried out as part of an assessment of aggressiveness.	Current UK practice for assessment of aggressiveness of ground and groundwater against concrete is guided by BRE Special Digest No 1 - Concrete in aggressive ground (BRE, 2005). The testing required for sulphates and pH is set out in Geospec 3.
BS1377:1990 Parts 2 to 7, Geospec3	GEO2:1377-3	90	4b	All of BS1377:1975.	BS1377:1990 parts 2 to 7. All test specific clauses of Geoguide 3.
BS EN ISO 22476-	GEO2:1377-4	93	4b	BS1377:1975 Test 19 (standard penetration test)	BS EN ISO 22476-3:2005+A1:2011
BS EN ISO 22476-	GEO2:1377-5	111	4b	BS1377:1975 Test 19 (standard penetration test)	BS EN ISO 22476-3:2005+A1:2011
BS EN ISO 22476-	GEO2:1377-6	111	5	BS1377:1975 Test 19 (standard penetration test)	BS EN ISO 22476-3:2005+A1:2011
BS EN ISO 22476-	GEO2:1377-7	112	4a	BS1377:1975 Test 19 (standard penetration test)	BS EN ISO 22476-3:2005+A1:2011
BS1377-9:1990	GEO2:1377-8	113	3b	BS1377:1975 Test 18 (borehole vane test)	BS1377-9:1990, cl 4.4
BS1377-9:1990	GEO2:1377-9	114	3b	BS1377:1975 Test 18 (borehole vane test)	BS1377-9:1990, cl 4.4
Geospec3	GEO2:1377-10	151	4b	BS1377:1975 Test 1A (nmc - oven drying method)	Geospec3, cl 5, Determination of moisture content
BS1377-2:1990	GEO2:1377-11	151	3b	Rapid methods described in BS1377:1975 Test 1 (natural moisture content).	BS1924-2:1990 has been withdrawn recently; some general guidance on available test methods is given in Clause 3.1 of BS1377-2:1990.
BS1377-9:1990, Geospec3	GEO2:1377-12	151	4a	BS1377:1975 Test 15 (in-situ density)	Geospec3, cl 11, Determination of in-situ bulk density, in-situ dry density and relative compaction; BS1377-9:1990 cl 2.4
Geospec3	GEO2:1377-13	151	4b	BS1377:1975 Test 15 (in-situ density) - describes three sand replacement test methods.	Geospec3 - describes two sand replacement test methods.
BS1377-9:1990	GEO2:1377-14	152	3a	BS1377:1975 Test 15 (in-situ density) - core cutter method.	BS1377-9:1990, cl 2.4
BS1377-2:1990	GEO2:1377-15	152	3b	BS1377:1975 Test 15 (in-situ density) - immersion in water method	BS1377-2:1990, cl 7.3
BS1377-2:1990	GEO2:1377-16	152	3b	BS1377:1975 Test 15 (in-situ density) - water displacement method	BS1377-2:1990, cl 7.4
BS1377-9:1990	GEO2:1377-17	165	3b	BS1377:1975 Test 16 (California bearing ratio), but modified by subsequent text in Geoguide 2. Test 16 is a laboratory test, whereas the test described in Geoguide 2 is an in-situ test.	BS1377-9:1990, cl 4.3
BS1377:1990 Parts 1 to 7, Geospec3	GEO2:1377-18	183	4a	BS1377:1975 - Laboratory tests.	Geospec3, BS1377:1990 Parts 1-8
Geospec3	GEO2:1377-19	240	4b	BS1377:1975 Test 1A (nmc - oven drying method)	Geospec3 cl 5 Determination of moisture content
Geospec3	GEO2:1377-20	240	4b	BS1377:1975 Tests 2A (liquid limit - cone penetrometer method), 2B (liquid limit - Casagrande method) and 3 (plastic limit)	Geospec3, cl 6, Determination of Atterberg Limits
BS1377-2:1990	GEO2:1377-21	240	3b	BS1377:1975 Test 5 (linear shrinkage)	BS1377-2:1990 cl 6 Determination of shrinkage characteristics; cl 6.5 Linear shrinkage
Geospec3	GEO2:1377-22	240	4b	BS1377:1975 Test 6 (specific gravity)	Geospec3, cl 7, Determination of particle density
Geospec3	GEO2:1377-23	240	4b	BS1377:1975 Test 7A (PSD - wet sieving)	Geospec3, cl 8, Determination of particle size distribution
BS1377-2:1990	GEO2:1377-24	240	2	BS1377:1975 Test 7B (PSD - dry sieving)	BS1377-2:1990 cl 9 Determination of particle size distribution; cl 9.3 Dry sieving method
Geospec3	GEO2:1377-25	240	2	BS1377:1975 Test 7A (PSD - wet sieving)	Geospec3, cl 8, Determination of particle size distribution
Geospec3	GEO2:1377-26	240	4b	BS1377:1975 Test 7C (pipette method)	Geospec3, cl 8, Determination of particle size distribution
Geospec3	GEO2:1377-27	241	4b	BS1377:1975 Test 8 (organic matter content)	Geospec3, cl 9, Determination of amount of chemical substances and electro-chemical properties
Geospec3	GEO2:1377-28	241	4b	BS1377:1975 Test 9 (total sulphate content of soil)	Geospec3, cl 9, Determination of amount of chemical substances and electro-chemical properties
Geospec3	GEO2:1377-29	241	4b	BS1377:1975 Test 9 (total sulphate content of soil)	Geospec3, cl 9, Determination of amount of chemical substances and electro-chemical properties



Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
Geospec3	GEO2:1377-30	241	4b	BS1377:1975 Test 10 (sulphate content of aqueous extract and groundwater)	Geospec3, cl 9, Determination of amount of chemical substances and electro-chemical properties
Geospec3	GEO2:1377-31	241	4b	BS1377:1975 Test 11A (pH - electrometric method)	Geospec3, cl 9, Determination of amount of chemical substances and electro-chemical properties
Geospec3	GEO2:1377-32	242	4b	BS1377:1975 Test 21 (quick undrained triaxial)	Geospec3, cl 15, Determination of shear strength of soils using triaxial apparatus
Geospec3	GEO2:1377-33	242	4b	BS1377:1975 Test 17 (1d consolidation)	Geospec3, cl 14, Determination of compressibility characteristics of soil
Geospec3	GEO2:1377-34	243	4b	BS1377:1975 Tests 12 (standard compaction - 2.5kg rammer?), 13 (4.5kg rammer?) and 14 (vibrating hammer?)	Geospec3, cl 10, Determination of dry density/moisture content relationship
Geospec3	GEO2:1377-35	243	4b	BS1377:1975 Test 15 (in-situ density)	Geospec3, cl 11, Determination of in-situ bulk density, in-situ dry density and relative compaction
Geospec3	GEO2:1377-36	243	4b	BS1377:1975 Test 16 (California bearing ratio)	Geospec3, cl 12, Determination of the California Bearing Ratio (CBR)
BS EN ISO 22476-	GEO2:1377-37	275	4a	BS1377:1975 Test 19 (standard penetration test) Figure 47	BS EN ISO 22476-3:2005+A1:2011 - Figure 1.
BS1377-9:1990	GEO2:1377-38	276	3a	BS1377:1975 Test 18 (borehole vane test) Figures 44, 45 and 46	BS1377-9:1990 cl 4.4 Determination of the in-situ vane shear strength of weak intact cohesive soils. Figures 16, 17 and 18.
<b>CP 1021:1973 Cathodic Protection</b>					
BS7361-1:1991	GEO2:1021-2	65	4a	Not found	The replacement standard is silent on the subject of bacteriological testing. The only mention is that redox testing should be undertaken as part of the assessment of risk of microbial attack. Redox testing is covered by BS1377-3:1990 for laboratory testing and BS1377-9:1990 for in-situ testing. See Annex A of BS7361-1:1991.
No current guidance	GEO2:1021-3	202	4a	Not found	Replacement standards for CP 1021:1973 contain no general guidance on ground conditions required for design.
BS1377-9:1990	GEO2:1021-4	241	4a	Not found	The current design standard is BS7361-1:1991. Testing required by that standard is required to be carried out in accordance with BS1377:1990, which is the current
N/A	GEO2:1021-5	241	2	Not found	There is no current standard or specification for bacteriological tests.
<b>BS1924:1975 Methods of Test for Stabilized Soils</b>					
BS1377-2:1990	GEO2:1924-2	90	3a	Information dispersed throughout BS1924:1975.	BS1924-2:1990 has been withdrawn recently; some general guidance on available test methods is given in Clause 3.1 of BS1377-2:1990.
<b>BS812:1975 Methods for Sampling and Testing of Mineral Aggregates, Sand and Fillers</b>					
BS812:1990 (largely withdrawn)	GEO2:812-2	90	5	Information dispersed throughout BS812:1975.	Information dispersed throughout BS812 (largely withdrawn, 13 parts current), BS EN 992 (5 parts), BS EN 993 (6 parts current, 5 parts due to be published) and BS EN 1097 (6 parts current, 4 parts due to be published). CS3 recently issued for use in Hong Kong.
BS812:1990 (largely withdrawn)	GEO2:812-3	202	2	General reference to BS812:1975.	Information dispersed throughout BS812 (largely withdrawn, 13 parts current), BS EN 992 (5 parts), BS EN 993 (6 parts current, 5 parts due to be published) and BS EN 1097 (6 parts current, 4 parts due to be published). CS3 recently issued for use in Hong Kong.
<b>BS4019:1974 Specification for Core Drilling Equipment</b>					
BS EN ISO 22475-1:2006	GEO2:4019-2	95	2	All of BS4019:1974. This is a material standard that provides full technical specifications for standard core barrels.	The current standard core barrel sizes are described in Annex C of BS EN ISO 22745-1:2006.
BS EN ISO 22475-1:2006	GEO2:4019-3	234	4b	All of BS4019:1974. This is a material standard that provides full technical specifications for standard core barrels.	The current standard core barrel sizes are described in Annex C of BS EN ISO 22745-1:2006.

Table D2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
<b>CP 1013:1965 Earthing</b>					
BS1377-9:1990	GEO2:1013-2	178	4a	Not found	The technique described in Geoguide 2 and referenced to CP1013:1965 is the basic Wener Array for measuring resistivity. The standard method for use of the Wener Array is described in BS1377-9:1990 cl 5.5. The need to cite CP1013:1965 in this instance can be removed by citing BS1377-9:1990.
BS7430:2011	GEO2:1013-3	202	2	Not found	BS7430:2011, cl 9.10.1 states 'More detail may be obtained by measuring the electrical resistivity of the soil, which provides an indication of corrosivity under aerated conditions, and the redox potential, which indicates the risk of corrosion due to the presence of anaerobic bacteria. These tests should be performed in compliance with BS
<b>CP 2012:1974 Code of Practice for Foundations for Machinery</b>					
N/A	GEO2:2012-2	202	1	CP2012:1974, cl 3.3	No alternative reference is proposed.
<b>BS5493:1977 Code of Practice for Protective Coating on Iron and Steel Structures Against Corrosion</b>					
N/A	GEO2:5493-2	202	2	Not found	No direct alternative is proposed. It is expected that equivalent information will be provided by reference to BS EN 1997-1:2004.
<b>BS5573:1978 Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes</b>					
BS8008:1996+A1:2008	GEO2:5573-2	358	3b	Not found	BS5573:1976 was superseded in UK practice by BS8008:1996+A1:2008. The standard remains current and is cited in the UK NA to BS EN 1997-1:2004.

Table D3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigations						
GEO2:5930-2a	3	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	No citation of reference document. Retain text.
GEO2:5930-2b	3	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	No citation of reference document. Retain text.
GEO2:5930-2c	3	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	No citation of reference document. Retain text.
GEO2:5930-3a	19	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	Retain current text and citations.
GEO2:5930-3b	19	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	Retain current text and citations.
GEO2:5930-3c	19	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	Retain current text and citations.
GEO2:5930-3d	19	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	Retain current text and citations.
GEO2:5930-3e	19	2	Historical non-technical descriptive text setting background to Geoguide 2.	N/A	N/A	Delete citation and amend text accordingly.
GEO2:5930-4	19	1	Historical descriptive text setting background to Geoguide 2.	N/A	N/A	Retain current text and citations.
GEO2:5930-5	82	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-6	83	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-7	136	2	General informative text.	Method described is not supported by any current standard.	Method described in existing text cannot be retained with an up-to-date reference. Method could be retained with no reference or method could be deleted.	Remove the whole text referring to the method.
GEO2:5930-8	144	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-9	147	4a	General informative text.	Identical informative text.	No change	Update reference and citation to BS EN ISO 22282-4:2012.
GEO2:5930-10	156	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-11	161	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-12	191	3a	General informative text.	Identical informative text.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-13	195	3a	Examples of reporting forms for various field tests and exploratory hole records.	Examples of reporting forms for various field tests and exploratory hole records are not now contained in a single reference document.	To approach providing the same number of examples would require multiple references, each specific to a particular form.	Forms contained in BS5930:1981 should be reproduced as figures in Geoguide 2. The citation of BS5930:1981 should be deleted.
GEO2:5930-14	234	4b	Table of core barrel sizes current in 1974.	Annex containing details of all current drill rods, casings and core barrels with references to manufacturing standards.	Information will be brought up to date.	Update reference and citation to BS EN ISO 22475-1:2006.
GEO2:5930-15	235	3a	Table of sample masses required for various tests.	Table of sample masses required for various tests.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-16	237	4b	Table of soil sample quality classes and permissible testing on each class.	Table of soil sample quality classes and permissible testing on each class.	No change	Update reference and citation to BS EN 1997-2:2007.

Table D3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
GEO2:5930-17	270	3a	Drawing showing examples of piezometer tips.	Drawing showing examples of piezometer tips.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-18	278	3a	Intake factors for various borehole geometries.	Intake factors for various borehole geometries.	No change	Update reference and citation to BS5930:1999+A2:2010.
GEO2:5930-19	289	4a	Drawing showing an example of a cone penetrometer tip.	Drawing showing examples of cone penetrometer tips.	No change	Update reference and citation to BS EN ISO 22476-1:2012.
GEO2:5930-20	293	3a	Diagrammatic representation of a plate loading test in a borehole.	Diagrammatic representation of a plate loading test in a borehole.	No change	Update reference and citation to BS5930:1999+A2:2010.
<b>BS6031:1981 Code of Practice for Earthworks</b>						
GEO2:6031-2	19	3a	General information.	General information.	No change	Update reference and citation to BS6031:2009.
GEO2:6031-3	44	2	Very limited general information.	Very limited general information.	No change	Delete citation and amend text accordingly.
GEO2:6031-4	171	3a	General information.	General information.	No change	Update reference and citation to BS6031:2009.
GEO2:6031-5	172	3a	General information.	General information.	No change	Update reference and citation to BS6031:2009.
GEO2:6031-6	202	3a	General design information.	General design information.	No change	Update reference and citation to BS6031:2009.
<b>BS8004:1986 Code of Practice for Foundations</b>						
GEO2:8004-2	50	1	General information.	N/A	N/A	Retain current citation and reference; but correct the clause numbering.
GEO2:8004-3	202	1	General information.	N/A	N/A	Retain current citation and reference.
GEO2:8004-4	241	1	General information regarding corrosion.	N/A	N/A	Retain current citation and reference.
<b>BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes</b>						
GEO2:1377-2	65	4a	Quoted standard is inappropriate as it is ambiguous in the context of the citation.	Appropriate current standard is for the required testing is Geospec 3.	Redrafting the clause and citing the appropriate standard will improve the usefulness of Geoguide	Redraft sentence and change reference and citation to Geospec 3.
GEO2:1377-3	90	4b	Required weights of material for various geotechnical laboratory tests.	Required weights of material for various geotechnical laboratory tests.	Updating the reference material would bring information up to date.	Update reference and citation to BS1377:1990 Parts 2 to 7 and Geospec 3.
GEO2:1377-4	93	4b	Description of SPT split barrel sampler.	Description of SPT split barrel sampler.	No change	Update reference and citation to BS EN 22746-3:2005+A1:2011.
GEO2:1377-5	111	4b	Description of Standard Penetration Test	Description of Standard Penetration Test	No change	Update reference and citation to BS EN 22746-3:2005+A1:2011.
GEO2:1377-6	111	5	Specification for conduct of the SPT.	Specification for conduct of the SPT.	The conduct (execution) of the test will be unaffected by the new standard provided the Geoguide 2 text is appropriately amended.	Update reference and citation to BS EN 22746-3:2005+A1:2011. Text to be appropriately amended to ensure current standards are not
GEO2:1377-7	112	4a	Description of Standard Penetration Test	Description of Standard Penetration Test	No change	Update reference and citation to BS EN 22746-3:2005+A1:2011.
GEO2:1377-8	113	3b	Specification for conduct of the borehole vane test.	Specification for conduct of the borehole vane test.	No change	Update reference and citation to BS1377-9:1990.
GEO2:1377-9	114	3b	Specification for conduct of the borehole vane test.	Specification for conduct of the borehole vane test.	No change	Update reference and citation to BS1377-9:1990.
GEO2:1377-10	151	4b	Method of test for natural moisture content.	Method of test for natural moisture content.	No change	Update reference and citation to Geospec3.
GEO2:1377-11	151	3b	Subsidiary methods of test for natural moisture content.	General guidance only on the test methods; the updated version of BS1924 has recently been withdrawn with no replacement.	The subsidiary methods available will change. The 'Speedy' tester and alcohol methods will be withdrawn. The Calcium Carbide method will be introduced. The sand bath method and microwave oven method will be retained but with only general guidance available.	Update reference and citation to BS1377-2:1990.
GEO2:1377-12	151	4a	Six test methods contained in a single reference.	Some of the equivalent test methods are contained in two separate standards.	Possible removal of some test methods.	The references for the individual methods should be cited in the text specific to the method.
GEO2:1377-13	151	4b	Three test methods contained in a single reference.	Two equivalent test methods contained in a single standards.	Removal of one test method.	Update reference and citation to Geospec3. Redraft the paragraph to delete mention of the withdrawn method.



Table D3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
GEO2:1377-14	152	3a	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to BS1377-9:1990.
GEO2:1377-15	152	3b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to BS1377-2:1990.
GEO2:1377-16	152	3b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to BS1377-2:1990.
GEO2:1377-17	165	3b	Ad hoc test method specified.	Recognised test method specified.	Improved clarity of test requirements.	Update reference and citation to BS1377-9:1990.
GEO2:1377-18	183	4a	General specifications for soil testing.	General specifications for soil testing.	Reference test methods brought into line with current practice.	Update reference and citation to BS1377:1990 Parts 1-7 and Geospec3.
GEO2:1377-19	240	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 5 required.
GEO2:1377-20	240	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 6 required.
GEO2:1377-21	240	3b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to BS1377-2:1990. Reference to cl 6.5 required.
GEO2:1377-22	240	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 7 required.
GEO2:1377-23	240	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 8 required.
GEO2:1377-24	240	2	Test method specified.	Test method specified.	No change	Remove the citation and revise text.
GEO2:1377-25	240	2	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Remove the citation and revise text.
GEO2:1377-26	240	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 8 required.
GEO2:1377-27	241	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 9 required.
GEO2:1377-28	241	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Additional specification of the clause number will be required - cl 9.3.5.1.
GEO2:1377-29	241	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Additional specification of the clause number will be required - cl 9.3.5.1.
GEO2:1377-30	241	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Additional specification of the clause number will be required - cl 9.3.5.2.

Table D3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
GEO2:1377-31	241	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 9 required.
GEO2:1377-32	242	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 15 required.
GEO2:1377-33	242	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 14 required.
GEO2:1377-34	243	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 10 required.
GEO2:1377-35	243	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 11 required.
GEO2:1377-36	243	4b	Test method specified.	Test method specified.	Reference test methods brought into line with current practice.	Update reference and citation to Geospec3. Reference to cl 12 required.
GEO2:1377-37	275	4a	Drawing of SPT split barrel sampler.	Drawing of SPT split barrel sampler.	No change	Update reference and citation to BS EN 22746-3:2005+A1:2011 Figure 1.
GEO2:1377-38	276	3a	Drawings of vane test equipment.	Drawings of vane test equipment.	No change	Update reference and citation to BS1377-9:1990 Figures 16, 17 and 18.
<b>CP 1021:1973 Cathodic Protection</b>						
GEO2:1021-2	65	4a	Not found but inferring from current standards there is unlikely to be any generally applicable advice.	Only general information given on the need for certain electrochemical tests to be carried out if steel is to be buried in the ground. No information found specific to testing for bacteria.	No change	Delete citation and amend text accordingly. Introduce reference to BS1377:1990.
GEO2:1021-3	202	4a	Not found.	Current standard contains no general advice on ground investigation. Requirements for geotechnically related electro-chemical tests contained in CP 1021:1973 are presented in other standards.	Alternative standards should be cited for specific tests.	Delete citation.
GEO2:1021-4	241	4a	Not found.	Inferred current standard gives precise method for carrying out the test identified in the text before the citation.	Improved clarity of test requirements.	Update reference and citation to BS1377-9:1990.
GEO2:1021-5	241	2	Not found.	No standard found relating to bacteriological testing in the context of ground investigation for buried steel subject to attack.	As there appears to be no specific guidance provided by the current reference, it is not clear how removing the citation will detract from Geoguide 2.	Delete citation and amend text accordingly.
<b>BS1924:1975 Methods of Test for Stabilized Soils</b>						
GEO2:1924-2	90	3a	Required weights of material for various geotechnical laboratory tests.	General guidance only on the test methods; the updated version of BS1924 has recently been withdrawn with no replacement.	Updating the reference material will provide general guidance only, however, there is as yet no replacement document for BS1924.	Update reference and citation to BS1377-2:1990.

Table D3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
BS812:1975 Methods for Sampling and Testing of Mineral Aggregates, Sand and Fillers						
GEO2:812-2	90	5	Aggregate testing standards.	Aggregate testing standards. See CS3 for Hong Kong use; in particular Section 8.	New local reference for aggregate testing standards.	It is not practical to update a single reference to the thirty current BS EN aggregate test standards. The current citation should be deleted and replaced with CS3 which was recently promulgated for use in Hong Kong.
GEO2:812-3	202	2	Aggregate testing standards.	Aggregate testing standards. See CS3 for Hong Kong use; in particular Section 8.	New local reference for aggregate testing standards.However, in the context of this paragraph of Geoguide 2 no guidance on analysis and application of ground data as provided by the inclusion of BS812.	It is not practical to update a single reference to the thirty current BS EN aggregate test standards. The current citation should be deleted and no replacement is required, as CS3 is a test specification and other references provide the necessary guidance referred to in this paragpah of Geoguide 2.
BS4019:1974 Specification for Core Drilling Equipment						
GEO2:4019-2	95	2	Material standard giving full technical details of equipment but fails to give any information on use, selection or sample quality.	Technical details of standard rotary coring equipment presented in a format accessible to users of equipment rather than manufacturers.	The current citation is not connected to appropriate text.	Delete citation and amend text accordingly.
GEO2:4019-3	234	4b	Material standard giving full technical details of equipment.	Technical details of standard rotary coring equipment presented in a format accessible to users of equipment rather than manufacturers.	Amendment will provide users of Geoguide 2 with current standard rotary drill rod, casing and core barrel information in a usable form.	Update reference and citation to BS EN ISO 22475-1:2006.
CP 1013:1965 Earthing						
GEO2:1013-2	178	4a	Not found. By inference from the text in Geoguide 2, it is assumed that the Standard describes an in-situ resistivity test using a Wener array.	Provides a method for carrying out in-situ resistivity tests using a Wener array.	No change	Update reference and citation to BS1377-9:1990.
GEO2:1013-3	202	2	Not found. By inference from the text in Geoguide 2, it is assumed that the Standard describes an in-situ resistivity test using a Wener array. It is not clear what other ground related advice the reference contains.	Minimal advice on soil testing specific to earthing. The advice may be considered deficient.	Current standard not relevant in the context of cl 40.3.1. Deletion will not make any difference to users of the Geoguide.	Delete citation and amend text accordingly.
CP 1012:1974 Code of Practice for Foundations for Machinery						
GEO2:2012-2	202	1	Specific advice on ground investigation for foundations designed to carry reciprocating machinery.	No alternative standard available.	No change	No change.
BS5493:1977 Code of Practice for Protective Coating on Iron and Steel Structures Against Corrosion						
GEO2:5493-2	202	2	Not found.	N/A	N/A	Remove citation and reference.
BS5573:1978 Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes						
GEO2:5573-2	358	3b	Not found.	Safety information on entry into large diameter pile shafts.	Provision of safety advice.	Update reference and citation to BS8008:1996+A1:2008.
Reference Section of Report						
GEO2:1013-1	211	2	This reference document is: Superseded, Withdrawn.	The current document(s) is (are): BS7430:2011	The current document contains no relevant information for ground investigation.	Delete the existing reference.
GEO2:1021-1	211	4a	This reference document is: Superseded, Withdrawn.	The current document(s) is (are): BS EN 13636:2004, BS EN 15112:2006	The current document contains no relevant information for ground investigation.	Delete the existing reference.
GEO2:4019-1	211	4b	This reference document is: Revised, Withdrawn.	The current document(s) is (are): BS 4019-3:1993+ISO 3551-1:1992, BS 4019-4:1993+ISO 3551-2:1992	The reference is to a manufacturing standard for equipment. Allthe relevant information is better presented in BS EN ISO 22475-1.	Delete existing reference and replace with BS EN ISO 22475-1:2006.
GEO2:2012-1	211	1	This reference document is: Confirmed, Current.	N/A		Retain existing reference.

**Table D3 - Description of Standards, Differences and Recommended Amendments**

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
GEO2:812-1	211	4b	This reference document is: Superseded, Withdrawn.	The current document(s) is (are): BS812 (largely withdrawn, 13 parts current) BS EN 932 (5 parts) BS EN 933 (6 parts current, 5 parts due to be published) BS EN 1097 (6 parts current, 4 parts due to be published)	However, local Construction Standard CS3 has recently been issued for local use; adopt CS3 instead.	Delete the existing reference and replace it with reference to Construction Standard CS3.
GEO2:1377-1	211	3b	This reference document is: Revised, Withdrawn.	The current document(s) is (are): Geospec3, BS1377:1990, BS EN ISO 22476-3:2005+A1:2011, BS1924-2:1990	The identified documents are directly equivalent to the existing citations in Geoguide 2.	Delete existing reference and replace with references to the listed documents.
GEO2:1924-1	211	3b	This reference document is: Revised, Withdrawn.	The current document(s) is (are): BS1924-1:1990, BS1924-2:1990	BS 1924-1:1990 is directly equivalent to the existing citations in Geoguide 2.	Delete existing reference and replace with BS 1924-1:1990.
GEO2:5493-1	211	2	This reference document is: Current, Superseded.	The current document(s) is (are): BS EN ISO 12944-1:1998, BS EN ISO 12944-2:1998, BS EN ISO 12944-3:1998, BS EN ISO 12944-4:1998, BS EN ISO 12944-5:2007, BS EN ISO 12944-6:1998, BS EN ISO 12944-7:1998, BS EN ISO 12944-8:1998, BS EN ISO 14713-1:2009, BS EN ISO 14713-2:2009, BS EN ISO 14713-3:2009	No single replacement document contains directly relevant information.	Delete the existing reference.
GEO2:5930-1	211	1	This reference document is: Revised, Withdrawn.	The current document(s) is (are): BS5930:1999+A2:2010, BS EN 1997-2:2007, BS EN ISO 22475-1:2006, BS EN ISO 22476-1:2012, BS EN ISO 22476-2:2005+A1:2011, BS EN ISO 22476-3:2005+A1:2011, BS EN ISO 22476-12:2009, BS EN ISO 22282-1:2012, BS EN ISO 22282-2:2012, BS EN ISO 22282-4:2012	The identified documents are directly equivalent to the existing citations in Geoguide 2.	The reference has to be retained as it is cited historically. Citation date will change from 1981a to 1981. Other references will need to be added.



**Geoguide 2: Guide to Site Investigation**

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
3	BS5930:1981	1 1 1	GEO2:5930-2a GEO2:5930-2b GEO2:5930-2c	<p>This Geoguide presents a recommended standard of good practice for site investigation in Hong Kong, the need for which was formally recognized as early as July 1983 by the Subcommittee of the Building Authority Working Party on Geotechnical Regulations. In its format and content, the Geoguide follows closely the <b>British Standard BS 5930 : 1981, Code of Practice for Site Investigations</b>, but the recommendations in the British Standard have been adapted to suit local conditions and practices. It should be used in conjunction with the companion document, Guide to Rock and Soil Descriptions (Geoguide 3). These Geoguides expand upon, and largely replace, Chapter 2 of the Geotechnical Manual for Slopes.</p> <p>This Geoguide covers <b>Sections 1 to 7 of BS 5930</b>, while Section 8 is dealt with in Geoguide 3. It has been prepared in such a way that the organization and format of the British Standard have generally been preserved. Where portions of <b>BS 5930</b> have been adopted in the text without significant amendment, this is clearly denoted by the use of an <i>italic</i> typeface.</p>	No Change
19	<b>BS5930:1981</b> <b>BS5930:1981</b> <b>BS5930:1981</b> <b>BS5930:1981</b> <b>BS5930:1981</b> <b>BS6031:1981</b>	<b>1</b> <b>1</b> <b>1</b> <b>1</b> <b>2</b> <b>3a</b>	<b>GEO2:5930-3a</b> <b>GEO2:5930-3b</b> <b>GEO2:5930-3c</b> <b>GEO2:5930-3d</b> <b>GEO2:5930-3e</b> <b>GEO2:6031-2</b>	<p>This Geoguide deals with the investigation of sites in Hong Kong for the purposes of assessing their suitability for civil engineering and building works, and of acquiring knowledge of site characteristics that affect the design and construction of such works and the security of adjacent properties. It is essentially BS 5930 1981: Code of Practice for Site Investigations (<b>BSI, 1981a</b>), modified as considered desirable for use in Hong Kong.</p> <p>While the basic structure and philosophy of <b>BSI (1981a)</b> has been maintained in this Geoguide. topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience. Other sections of <b>BSI (1981a)</b> have been repeated herein without significant amendment, and this has been denoted by an <i>italic</i> script. Less relevant or rarely-used portions of <b>BSI (1981a)</b> have been incorporated only by reference, or have been specifically deleted.</p> <p>In this Geoguide, <b>as in BSI (1981a)</b>, the expression "site investigation" has been used in its wider sense. It is often used elsewhere in a narrow sense to describe what has been termed herein "ground investigation". The use of soil and rock as construction materials is treated only briefly; further information on this is given in <b>BSI (1981b)</b>.</p>	<p>This Geoguide deals with the investigation of sites in Hong Kong for the purposes of assessing their suitability for civil engineering and building works, and of acquiring knowledge of site characteristics that affect the design and construction of such works and the security of adjacent properties. It is essentially BS 5930 1981: Code of Practice for Site Investigations (<b>BSI, 1981</b>), modified as considered desirable for use in Hong Kong.</p> <p>While the basic structure and philosophy of <b>BSI (1981)</b> has been maintained in this Geoguide. topics of particular importance in Hong Kong have been supplemented or rewritten in the light of local conditions and experience. Other sections of <b>BSI (1981)</b> have been repeated herein without significant amendment, and this has been denoted by an <i>italic</i> script. Less relevant or rarely-used portions of <b>BSI (1981)</b> have been incorporated only by reference, or have been specifically deleted.</p> <p>In this Geoguide, the expression "site investigation" has been used in its wider sense. It is often used elsewhere in a narrow sense to describe what has been termed herein "ground investigation". The use of soil and rock as construction materials is treated only briefly; further information on this is given in <b>BSI (2009)</b>.</p>
19	BS5930:1981	1	GEO2:5930-4	<p>The last section of <b>BSI (1981a)</b>, which deals with the description of soils and rocks, is not covered in this Geoguide. A companion document, Geoguide 3: Guide to Rock and Soil Descriptions (GCO, 1988), has been devoted entirely to this topic, and the reader should refer to it for guidance on the description and classification of Hong Kong rocks and soils.</p>	<p>The last section of <b>BSI (1981)</b>, which deals with the description of soils and rocks, is not covered in this Geoguide. A companion document, Geoguide 3: Guide to Rock and Soil Descriptions (GCO, 1988), has been devoted entirely to this topic, and the reader should refer to it for guidance on the description and classification of Hong Kong rocks and soils.</p>
44	BS6031:1981	2	GEO2:6031-3	<p>In the case of slope failure, or where such failure is considered imminent, it is common practice to monitor movements both of the surface and underground. The former is conducted by conventional survey methods and the latter by means of slip indicators or inclinometer measurements. These techniques are fully described in <b>BSI (1981b)</b> and in the Geotechnical Manual for Slopes (GCO, 1984). It is also usually necessary to monitor groundwater pressures within the various underlying zones (see Chapter 20).</p>	<p>In the case of slope failure, or where such failure is considered imminent, it is common practice to monitor movements both of the surface and underground. The former is conducted by conventional survey methods and the latter by means of slip indicators or inclinometer measurements. These techniques are fully described in the Geotechnical Manual for Slopes (GCO, 1984). It is also usually necessary to monitor groundwater pressures within the various underlying zones (see Chapter 20).</p>

## Geoguide 2: Guide to Site Investigation

Table D4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
50	BS8006:1986	1	GEO2:8004-2	10.3.3 Foundations for Structures Most structures in Hong Kong are founded on piles. Hand-dug caissons, driven piles, machine-bored piles and barrettes are commonly used. A general approach to planning a ground investigation suitable for pile design purposes is given in ICE (1978). The investigation should make a full appraisal of the site and the ground conditions should be investigated at depths well below the proposed pile toe level to allow for variations in the pile design. Knowledge of the groundwater conditions is also required. Further advice on ground investigation for foundations is given in Section 10.7.2, <b>BSI (1986)</b> and Weltman & Head (1983).	10.3.3 Foundations for Structures Most structures in Hong Kong are founded on piles. Hand-dug caissons, driven piles, machine-bored piles and barrettes are commonly used. A general approach to planning a ground investigation suitable for pile design purposes is given in ICE (1978). The investigation should make a full appraisal of the site and the ground conditions should be investigated at depths well below the proposed pile toe level to allow for variations in the pile design. Knowledge of the groundwater conditions is also required. Further advice on ground investigation for foundations is given in Section 7.2.1, <b>BSI (1986)</b> and Weltman & Head (1983).
65	BS1377:1975	4a	GEO2:1377-2	13.2 INVESTIGATION OF POTENTIAL DETERIORATION OF CONCRETE Laboratory tests to assess the aggressiveness of the ground and groundwater against Portland cement concrete include determination of pH value and sulphate content ( <b>BSI, 1975b</b> ). Reference should be made to BRE (1981) regarding the determination of water-soluble sulphate concentrations. The pH value may be altered if there is a delay between sampling and testing, so field determinations should be made if possible.	13.2 INVESTIGATION OF POTENTIAL DETERIORATION OF CONCRETE Laboratory tests to assess the aggressiveness of the ground and groundwater against Portland cement concrete include determination of pH value and sulphate content ( <b>GEO, 2001</b> ). Reference should be made to BRE (1981) regarding the determination of water-soluble sulphate concentrations. The pH value may be altered if there is a delay between sampling and testing, so field determinations should be made if possible.
65	CP1021:1973	4a	GEO2:1021-2	13.3 INVESTIGATION OF POTENTIAL CORROSION OF STEEL The likelihood of corrosion of steel can be assessed from tests of resistivity, redox potential, pH, chloride ion content, total sulphate content, sulphate ion content, and total sulphide content. Details of these tests, and relevant limits for a relatively non-aggressive environment for steel, are given in the Model Specification for Reinforced Fill Structures (Brian-Boys et al, 1986). Chemical tests should be done on undisturbed specimens which have been placed in clean airsealed containers immediately after sampling. If bacteriological attack is expected, undisturbed specimens should be placed in sterilized containers and <b>tested in accordance with BSI (1973)</b> (see also Section 13.2 and Table 12).	13.3 INVESTIGATION OF POTENTIAL CORROSION OF STEEL The likelihood of corrosion of steel can be assessed from tests of resistivity, redox potential, pH, chloride ion content, total sulphate content, sulphate ion content, and total sulphide content. Details of these tests, and relevant limits for a relatively non-aggressive environment for steel, are given in <b>Geoguide 6 (GEO, 2002)</b> . Chemical tests should be done on undisturbed specimens, which have been placed in clean airtight containers immediately after sampling. If bacteriological attack is expected, undisturbed specimens should be placed in sterilized containers and tested in accordance with <b>BSI (1990)</b> (see also Section 13.2 and Table 12).
82	BS5930:1981	3a	GEO2:5930-5	18.3 HEADINGS OR ADITS Headings are driven from the bottom of shafts or laterally into sloping ground, and can be used for the insitu examination of the ground or existing foundation structures, and for carrying out special sampling or in situ testing. Further considerations are given in <b>BSI (1981a)</b> .	18.3 HEADINGS OR ADITS Headings are driven from the bottom of shafts or laterally into sloping ground, and can be used for the insitu examination of the ground or existing foundation structures, and for carrying out special sampling or in situ testing. Further considerations are given in <b>BSI (2010)</b> .
83	BS5930:1981	3a	GEO2:5930-6	18.6 MECHANICAL AUGERS Mechanical augers, comprising a continuous-flight auger and a hollow stern, are suitable for augering soft cohesive soils and may be suitable for firm cohesive soils. They are of limited use in soils with boulders or cores tones and are therefore seldom used in Hong Kong. Further considerations are given in <b>BSI (1981a)</b> .	18.6 MECHANICAL AUGERS Mechanical augers, comprising a continuous-flight auger and a hollow stern, are suitable for augering soft cohesive soils and may be suitable for firm cohesive soils. They are of limited use in soils with boulders or cores tones and are therefore seldom used in Hong Kong. Further considerations are given in <b>BSI (2010)</b> .
90	<b>BS812:1975</b> <b>BS1377:1975</b> <b>BS1924:1975</b>	<b>5</b> <b>4b</b> <b>3a</b>	<b>GEO2:812-2</b> <b>GEO2:1377-3</b> <b>GEO2:1924-2</b>	<b>BSI (1975b; 1975c)</b> give precise details of the mass of soil sample required for each type of test. Where the approximate number of tests is known, it is a simple matter to estimate the total amount of soil that has to be obtained. If the programme of laboratory tests is uncertain, Table 7 gives some guidance on the amount of soil that should be obtained for each series of tests. <b>Where materials for mineral aggregates, sands and filters are being considered, details of the size of sample required are given in BSI (1975a).</b>	<b>GEO (2001)</b> and <b>BSI (1990)</b> give precise details of the mass of soil sample required for each type of test. Where the approximate number of tests is known, it is a simple matter to estimate the total amount of soil that has to be obtained. If the programme of laboratory tests is uncertain, Table 7 gives some guidance on the amount of soil that should be obtained for each series of tests. Where materials for mineral aggregates, sands and filters are being considered, details of the size of sample required are given in <b>CS3:2013</b> .
93	BS1377:1975	4b	GEO2:1377-4	19.4.5 Split Barrel Standard Penetration Test Sampler The split barrel sampler is used in the standard penetration test and is described in <b>Test 19 of BSI (1975b)</b> . It takes samples 35 mm in diameter and has an area ratio of about 100%. It is used to recover small samples, particularly under conditions which prevent the use of the general purpose 100 mm sampler, and gives class 3 or class 4 samples (see Section 21.2 and Figure 25).	19.4.5 Split Barrel Standard Penetration Test Sampler The split barrel sampler is used in the standard penetration test and is described in <b>BSI (2011b)</b> . It takes samples 35 mm in diameter and has an area ratio of about 100%. It is used to recover small samples, particularly under conditions which prevent the use of the general purpose 100 mm sampler, and gives class 3 or class 4 samples (see Section 21.2 and Figure 25).

## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
95	BS4019:1974	2	GEO2:4019-2	Samples are obtained by the rotary core drilling procedures described in Section 18.7. The quality of sample may vary considerably depending on the character of the ground and the type of coring equipment used (BSI, 1974a).	Samples are obtained by the rotary core drilling procedures described in Section 18.7. The quality of sample may vary considerably depending on the character of the ground and the type of coring equipment used.
111	BS1377:1975	4b	GEO2:1377-5	The standard penetration test is a frequently used dynamic penetration test and is described in Test 19 of BSI (1975b).	The standard penetration test is a frequently used dynamic penetration test and is described in BSI (2011b).
111	BS1377:1975	5	GEO2:1377-6	Minor variations from the specified equipment and procedures can seriously affect the results of the test (De Mello. 1971; Ireland et al. 1970; Nixon. 1982; Skempton. 1986). It is important that the test is carried out precisely as described in Test 19 of BSI (1975b), except that the following modifications should be incorporated: (a) An automatic release trip hammer (Plate 7B) should be used to drive the sampler. (b) The weight of the hammer in the drive assembly should be 63.5 kg. (c) The diameter of the borehole should be between 60 mm and 200 mm. (d) Drill rods with a stiffness equal to or greater than type BW rods should be used to reduce energy dissipation. These modifications bring the test procedures into conformity with the proposed international standardization of the test (ISSMFE, 1977).	Minor variations from the specified equipment and procedures can seriously affect the results of the test (De Mello. 1971; Ireland et al. 1970; Nixon. 1982; Skempton. 1986). It is important that the test is carried out precisely as described in BSI (2011b), except that the following modifications should be incorporated: (a) The diameter of the borehole should be between 60 mm and 200 mm. (b) Drill rods with a stiffness equal to or greater than type BW rods should be used to reduce energy dissipation. (c) The results of standard penetration tests should be included in borehole records without the application of corrections.
112	BS1377:1975	4a	GEO2:1377-7	When the test is carried out in granular soils below groundwater level, the soil may become loosened, even when the test is carried out in strict accordance with BSI (1975b) and the borehole has been properly prepared. In certain circumstances, it can be useful to continue driving the sampler beyond the distance specified, adding further drill rods as necessary. Although this is not a standard penetration test, and should not be regarded as such, it may, at least, give an indication as to whether the deposit is really as loose as the standard test may indicate. When there is good reason to believe that unrealistically low values are being recorded, consideration should be given to the use of some other test which can be performed independently of a borehole, e.g. the cone penetration test described in Section 23.3.	When the test is carried out in granular soils below groundwater level, the soil may become loosened, even when the test is carried out in strict accordance with BSI (2011b) and the borehole has been properly prepared. In certain circumstances, it can be useful to continue driving the sampler beyond the distance specified, adding further drill rods as necessary. Although this is not a standard penetration test, and should not be regarded as such, it may, at least, give an indication as to whether the deposit is really as loose as the standard test may indicate. When there is good reason to believe that unrealistically low values are being recorded, consideration should be given to the use of some other test which can be performed independently of a borehole, e.g. the cone penetration test described in Section 23.3.
113	BS1377:1975	3b	GEO2:1377-8	A cruciform vane on the end of a solid rod is forced into the soil and then rotated (Figure 26). The torque required to rotate the vane can be related to the shear strength of the soil. The method of carrying out the test is described in Test 18 of BSI (1975b). Vanes can take the form of borehole vanes or penetration vanes, the latter being much more reliable. The test can be extended to measure the remoulded strength of the soil. This is done by turning the vane through ten complete rotations. A pause of not more than one minute is permitted to elapse and the vane test is then repeated in the normal way. The degree of disturbance caused by rotating the vane differs from that obtained by remoulding a sample of clay in the laboratory, and the numerical value of the sensitivity of the clay determined by these procedures is not strictly comparable with the results obtained from laboratory triaxial tests.	A cruciform vane on the end of a solid rod is forced into the soil and then rotated (Figure 26). The torque required to rotate the vane can be related to the shear strength of the soil. The method of carrying out the test is described in BSI (1990). Vanes can take the form of borehole vanes or penetration vanes, the latter being much more reliable. The test can be extended to measure the remoulded strength of the soil. This is done by turning the vane through ten complete rotations. A pause of not more than one minute is permitted to elapse and the vane test is then repeated in the normal way. The degree of disturbance caused by rotating the vane differs from that obtained by remoulding a sample of clay in the laboratory, and the numerical value of the sensitivity of the clay determined by these procedures is not strictly comparable with the results obtained from laboratory triaxial tests.
114	BS1377:1975	3b	GEO2:1377-9	With the penetration vane test apparatus (vane borer) described in Test 18 of BSI (1975b), the vane and a protective casing (Plate 8) are forced into the ground by jacking. At the required depth, the vane is advanced a short distance ahead of the protective casing, the test is conducted, and the casing and vane are then subsequently advanced to the next required depth. However, with this type of test it is not always possible to penetrate to the desired layer without the assistance of pre-boring.	With the penetration vane test apparatus (vane borer) described in BSI (1990), the vane and a protective casing (Plate 8) are forced into the ground by jacking. At the required depth, the vane is advanced a short distance ahead of the protective casing, the test is conducted, and the casing and vane are then subsequently advanced to the next required depth. However, with this type of test it is not always possible to penetrate to the desired layer without the assistance of pre-boring.

## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
136	BS5930:1981	2	GEO2:5930-7	23.4 STATIC-DYNAMIC PROBING The standard penetration test is rather insensitive in loose materials and is not truly relevant to cohesive soils. On the other hand, the cone penetrometer is of limited use when dense or stiff layers are encountered. The static-dynamic test combines the two methods (Sherwood & Child, 1974); <b>this technique is further discussed in BSI (1981a).</b>	23.4 STATIC-DYNAMIC PROBING The standard penetration test is rather insensitive in loose materials and is not truly relevant to cohesive soils. On the other hand, the cone penetrometer is of limited use when dense or stiff layers are encountered. The static-dynamic test combines the two methods (Sherwood & Child, 1974).
144	BS5930:1981	3a	GEO2:5930-8	In cl 25.2 GROUNDWATER CONDITIONS The three types of groundwater conditions may be recognized by the test response <b>(BSI, 1981a).</b>	In cl 25.2 GROUNDWATER CONDITIONS The three types of groundwater conditions may be recognized by the test response <b>(BSI, 2010).</b>
147	BS5930:1981	4a	GEO2:5930-9	In cl 25.7 ANALYSIS OF RESULTS: The simpler form of analysis is the steady state type, but the necessary duration of pumping can be significantly longer than that necessary for nonsteady state analysis. The analysis technique is also dependent on aquifer response, i.e. whether confined or unconfined conditions are present. A summary of some of the available analysis techniques is given in BSI <b>(1981a)</b> , and these are further discussed by Johnson (1982) and Kruseman & DeRidder (1980).	In cl 25.7 ANALYSIS OF RESULTS: The simpler form of analysis is the steady state type, but the necessary duration of pumping can be significantly longer than that necessary for nonsteady state analysis. The analysis technique is also dependent on aquifer response, i.e. whether confined or unconfined conditions are present. A summary of some of the available analysis techniques is given in BSI <b>(2012c)</b> , and these are further discussed by Johnson (1982) and Kruseman & DeRidder (1980).
151	BS1377:1975	4b 3b	<b>GEO2:1377-10</b> <b>GEO2:1377-11</b>	The methods described generally measure bulk density, and representative moisture contents are required if the dry density is to be calculated. Ideally, the weight of the moisture content sample should be determined on site, then the sample should be transported to the laboratory for oven drying in accordance with <b>BSI (1975b), Test 1A</b> . Otherwise, the entire sample has to be preserved in an airtight container until it can be weighed. Alternatively, a rapid determination of moisture content can be made using a microwave oven, the 'Speedy' moisture tester, or one of the rapid methods described in <b>BSI (1975b), Test 1</b> . However, all such rapid determinations should be thoroughly correlated with the standard oven-drying technique for the particular soil type being tested. In any case, moisture content samples should be as representative and as large as practical, or several determinations should be made in order to obtain a reliable mean value.	The methods described generally measure bulk density, and representative moisture contents are required if the dry density is to be calculated. Ideally, the weight of the moisture content sample should be determined on site, then the sample should be transported to the laboratory for oven drying in accordance with <b>GEO (2001)</b> . Otherwise, the entire sample has to be preserved in an airtight container until it can be weighed. Alternatively, a rapid determination of moisture content can be made using a microwave oven, the 'Speedy' moisture tester, or one of the rapid methods described in <b>BSI (1990)</b> . However, all such alternative determinations should be thoroughly correlated with the standard oven-drying technique for the particular soil type being tested. In any case, moisture content samples should be as representative and as large as practical, or several determinations should be made in order to obtain a reliable mean value.
151	BS1377:1975	4a	GEO2:1377-12	With the exception of the water replacement method for rock fill (see Section 27.8), the methods outlined below are described further in <b>Test 15 of BSI (1975b)</b> or the ASTM standards quoted.	With the exception of the water replacement method for rock fill (see Section 27.8), the methods outlined below are described further in <b>Geospec 3 (GEO, 2001) and BSI (1990)</b> or the ASTM standards quoted.
151	BS1377:1975	4b	GEO2:1377-13	27.2 SAND REPLACEMENT METHOD <b>BSI (1975b)</b> describes <b>three</b> variations on the sand replacement method. The first, employing a small pouring cylinder, is used for fine and medium grained soils, <b>as defined in BSI (1975b)</b> . The second, using a large pouring cylinder, is suitable for fine, medium and coarse grained soils. <b>The third, the scoop method, may be used for fine, medium and coarse grained soils, but it is less precise than the first two and yields less reliable results; its use should be restricted to occasions where no pouring cylinder is available.</b>	27.2 SAND REPLACEMENT METHOD GEO (2001) describes two variations on the sand replacement method. The first, employing a small pouring cylinder, is used for fine and medium grained soils. The second, using a large pouring cylinder, is suitable for fine, medium and coarse grained soils.
152	BS1377:1975	3a	GEO2:1377-14	27.3 CORE CUTTER METHOD The core cutter method is described in <b>BSI (1975b)</b> . The method depends upon being able to drive a cylindrical cutter into the soil without significant change of density and to retain the sample inside it so that the known internal volume of the cylinder is completely filled. It is therefore restricted to fine soils that are sufficiently cohesive for the sample not to fall out, and to completely decomposed rock free of large fragments. The method is generally less accurate than the sand replacement method because driving the sampler tends to alter the density of the soil.	27.3 CORE CUTTER METHOD The core cutter method is described in <b>BSI (1990)</b> . The method depends upon being able to drive a cylindrical cutter into the soil without significant change of density and to retain the sample inside it so that the known internal volume of the cylinder is completely filled. It is therefore restricted to fine soils that are sufficiently cohesive for the sample not to fall out, and to completely decomposed rock free of large fragments. The method is generally less accurate than the sand replacement method because driving the sampler tends to alter the density of the soil.



## Geoguide 2: Guide to Site Investigation

Table D4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
152	BS1377:1975	3b	GEO2:1377-15	27.4 WEIGHT IN WATER METHOD The weight in water method is described in <b>BSI (1975b)</b> . It is applicable to any soil where representative samples occur in discrete lumps that will not disintegrate during handling and submersion in water. In practice the method is restricted mainly to cohesive soils.	27.4 <b>IMMERSION</b> IN WATER METHOD The <b>immersion</b> in water method is described in <b>BSI (1990)</b> . It is applicable to any soil where representative samples occur in discrete lumps that will not disintegrate during handling and submersion in water. In practice the method is restricted mainly to cohesive soils.
152	BS1377:1975	3b	GEO2:1377-16	27.5 WATER DISPLACEMENT METHOD The water displacement method is described in <b>BSI (1975b)</b> . It is an alternative to the weight in water method and has the same limitations.	27.5 WATER DISPLACEMENT METHOD The water displacement method is described in <b>BSI (1990)</b> . It is an alternative to the <b>immersion</b> in water method and has the same limitations.
156	BS5930:1981	3a	GEO2:5930-10	In cl 28.2 STRESS MEASUREMENTS IN ROCK: Special methods for measuring and interpreting the uniaxial, biaxial or triaxial state of stress in a rock mass are described in <b>BSI (1981a)</b> .	In cl 28.2 STRESS MEASUREMENTS IN ROCK: Special methods for measuring and interpreting the uniaxial, biaxial or triaxial state of stress in a rock mass are described in <b>BSI (2010)</b> .
161	BS5930:1981	3a	GEO2:5930-11	In cl 29.1.4 Test Arrangement: A comparable arrangement for performing the test in an adit is given in <b>BSI (1981a)</b> .	In cl 29.1.4 Test Arrangement: A comparable arrangement for performing the test in an adit is given in <b>BSI (2010)</b> .
165	BS1377:1975	3b	GEO2:1377-17	29.4.2 Test Method The test is carried out by the method described in <b>Test 16 of BSI (1975b) excluding the compaction, and subject only to those alterations necessary to enable it to be carried out in the field</b> . The load is generally applied through a screw jack using the weight of a vehicle as jacking resistance, and deflections are measured by dial gauges carried on a bridge with independent foundations resting on the ground well clear of the test area. <b>A circular area of about 100 mm diameter is trimmed flat, special care being taken with the central area on which the plunger will bear. A thin layer of fine sand may be used to seat the plate but the use of sand to seat the plunger itself should be avoided. If it is impossible to trim the soil sufficiently to obtain good seating of the plunger, a thin layer of plaster of paris may be used, care being taken to remove any plaster extending beyond the area of the plunger. Further details of the insitu test are given elsewhere (Road Research Laboratory, 1952).</b>	29.4.2 Test Method The test is carried out by the method described in <b>BSI (1990)</b> . The load is generally applied through a screw jack using the weight of a vehicle as jacking resistance, and deflections are measured by dial gauges carried on a bridge with independent foundations resting on the ground well clear of the test area. <i>[NB Road Research Laboratory (1952) should also need to be removed from the references as this is its only citation.]</i>
171	BS6031:1981	3a	GEO2:6031-4	31.2 METHODS OF INSTRUMENTATION Several techniques can be used in ground investigation to monitor displacements and strains associated with known or suspected ground movements resulting from slope failures, foundation displacement, subsidence and ground response in large-scale field trials (BGS, 1973; Brown, 1981; <b>BSI, 1981b</b> ; GCO, 1984; Hanna, 1985). A review of instruments commonly used in Hong Kong is given by Coleman (1984). Handfelt et al (1987) have described the performance of the instrumentation used in an offshore test fill (see also Foott et al, 1987).	31.2 METHODS OF INSTRUMENTATION Several techniques can be used in ground investigation to monitor displacements and strains associated with known or suspected ground movements resulting from slope failures, foundation displacement, subsidence and ground response in large-scale field trials (BGS, 1973; Brown, 1981; <b>BSI, 2009</b> ; GCO, 1984; Hanna, 1985). A review of instruments commonly used in Hong Kong is given by Coleman (1984). Handfelt et al (1987) have described the performance of the instrumentation used in an offshore test fill (see also Foott et al, 1987).
172	BS6031:1981	3a	GEO2:6031-5	Compaction trials can include experiments with variable borrow materials, layer thicknesses, amounts of watering and amounts of work performed in compaction. Measurements should be made of insitu density and water content; the results should be compared with those from laboratory compaction tests, to obtain a specification standard, and with insitu borrow pit densities, so that the degree of bulking or volume reduction can be estimated for given quantities ( <b>BSI, 1981b</b> ). Trials of equipment can also be undertaken. Care should be taken not to vary too many factors at the same time, otherwise the effects of variation of an individual factor cannot be estimated.	Compaction trials can include experiments with variable borrow materials, layer thicknesses, amounts of watering and amounts of work performed in compaction. Measurements should be made of insitu density and water content; the results should be compared with those from laboratory compaction tests, to obtain a specification standard, and with insitu borrow pit densities, so that the degree of bulking or volume reduction can be estimated for given quantities ( <b>BSI, 2009</b> ). Trials of equipment can also be undertaken. Care should be taken not to vary too many factors at the same time, otherwise the effects of variation of an individual factor cannot be estimated.



## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
178	CP1013:1965	4a	GEO2:1013-2	<p>33.2.1 Resistivity</p> <p>This technique is used for investigating the simpler geological problems. A current is usually passed into the ground through two metal electrodes, and the potential difference is measured between two similar electrodes (BSI, 1965). With suitable deployment of the electrodes, the system may be used to provide information on the variation of geo-electrical properties with depth (depth probes), lateral changes in resistivity (constant separation traversing) or local anomalous areas (equipotential survey), e.g. karst features, disused tunnels or shafts. The unsuspected presence of electrical conductors, e.g. pipes or cables, under the site will, of course, render the results unreliable. The interpretation of the results obtained by this method does not always provide a definite solution. particularly as the number of subsurface layers increases, because it involves a curve matching technique which requires the assumption of idealised conditions.</p>	<p>33.2.1 Resistivity</p> <p>This technique is used for investigating the simpler geological problems. A current is usually passed into the ground through two metal electrodes, and the potential difference is measured between two similar electrodes (BSI, 1990). With suitable deployment of the electrodes, the system may be used to provide information on the variation of geo-electrical properties with depth (depth probes), lateral changes in resistivity (constant separation traversing) or local anomalous areas (equipotential survey), e.g. karst features, disused tunnels or shafts. The unsuspected presence of electrical conductors, e.g. pipes or cables, under the site will, of course, render the results unreliable. The interpretation of the results obtained by this method does not always provide a definite solution. particularly as the number of subsurface layers increases, because it involves a curve matching technique which requires the assumption of idealised conditions.</p>
183	BS1377:1975	4a	GEO2:1377-18	<p>A thorough discussion of laboratory testing is beyond the scope of this Geoguide. However, some basic aspects are briefly reviewed in Chapters 35 to 38 as laboratory testing is considered to be a part of the ground investigation, and the overall site investigation would normally not be complete without it. Further guidance on laboratory testing of rocks and soils is given in Brown (1981) and BSI (1975b) respectively. The Geotechnical Manual for Slopes (GCO, 1984) discusses the testing of Hong Kong rocks and soils in particular. Guidance on the description and classification of Hong Kong rocks and soils is given in Geoguide 3 (GCO, 1988).</p>	<p>A thorough discussion of laboratory testing is beyond the scope of this Geoguide. However, some basic aspects are briefly reviewed in Chapters 35 to 38 as laboratory testing is considered to be a part of the ground investigation, and the overall site investigation would normally not be complete without it. . Further guidance on laboratory testing of rocks and soils is given in Brown (1981) and for soils in BSI (1990) and GEO (2001), respectively. The Geotechnical Manual for Slopes (GCO, 1984) discusses the testing of Hong Kong rocks and soils in particular. Guidance on the description and classification of Hong Kong rocks and soils is given in Geoguide 3 (GCO, 1988).</p>
191	BS5930:1981	3a	GEO2:5930-12	<p>Laboratory tests on rock material are undertaken to determine classification, strength and deformation parameters. Tests to determine the basic shear strength of specific discontinuities may also be undertaken. Table 13 lists the range of common laboratory tests on rock, together with references and remarks on their use. Some of these tests are reviewed in the Geotechnical Manual for Slopes (GCO, 1984) and BSI (1981a). The significance of the size and quality of the sample, the test conditions and the relevance of the results, as discussed in Chapter 37 for soils, also apply in general to tests on rock.</p>	<p>Laboratory tests on rock material are undertaken to determine classification, strength and deformation parameters. Tests to determine the basic shear strength of specific discontinuities may also be undertaken. Table 13 lists the range of common laboratory tests on rock, together with references and remarks on their use. Some of these tests are reviewed in the Geotechnical Manual for Slopes (GCO, 1984) and BSI (2010). The significance of the size and quality of the sample, the test conditions and the relevance of the results, as discussed in Chapter 37 for soils, also apply in general to tests on rock.</p>
195	BS5930:1981	3a	GEO2:5930-13	<p>The essential requirement of a field report is that it should contain all the data necessary for the subsequent interpretation and use of the borehole or field test. Field report forms should be easy to fill in and well laid out so as to encourage the operator or field supervisor to record all necessary data. Such forms can in many cases be based upon the illustrative logs contained in this Geoguide, but these need not be regarded as standard as other forms may also be satisfactory. Examples of other field report forms can be found in BSI (1981a).</p>	<p>The essential requirement of a field report is that it should contain all the data necessary for the subsequent interpretation and use of the borehole or field test. Field report forms should be easy to fill in and well laid out so as to encourage the operator or field supervisor to record all necessary data. Such forms can in many cases be based upon the illustrative logs contained in this Geoguide, but these need not be regarded as standard as other forms may also be satisfactory. Examples of other field report forms can be found in BSI (1990) and the appropriate Parts of BSI (2011a, 2011b, 2012a, 2012b, 2012c, 2012d, 2012e, 2012f).</p>

## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
202	CP1013:1965 CP1021:1973 CP2012:1974 BS812:1975 BS5493:1977 BS6031:1981 BS8004:1986	2 4a 1 2 2 3a 1	GEO2:1013-3 GEO2:1021-3 GEO2:2012-2 GEO2:812-3 GEO2:5493-2 GEO2:6031-6 GEO2:8004-3	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1965; 1973; 1974b; 1975a; 1977; 1981b; 1986) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.	40.3 ENGINEERING INTERPRETATION 40.3.1 Matters to be Covered Methods of analysing ground data and applying them to the solution of engineering problems are not covered in this Geoguide. Guidance on analysis and application of ground data may be found in various British Standards (e.g. BSI, 1974b; 1986; 1991, 2004; 2007; 2009) and local guidance documents (e.g. Geotechnical Manual for Slopes and Geoguide 1). Sections 40.3.2 to 40.3.9 deal with the form of the report, and list the most common topics on which advice and recommendations are required. These sections also contain some guidance on what should be included. The topics are listed briefly under the general headings: design, construction expedients, sources of materials, and failure. It is likely that in many cases the client commissioning the investigation will indicate those aspects of the project on which he requires advice and recommendations; the topics listed below are intended as a guide where this may not have been done.
211	CP1013:1965	2	GEO2:1013-1	BSI (1965) Earthing (CP 1013:1965). British Standards Institution, London, 132 p.	<i>[Delete all text.]</i>
211	CP1021:1973	4a	GEO2:1021-1	BSI (1973) Cathodic Protection (CP 1021:1973), British Standards Institution, London, 104 p.	BSI (1991). Cathodic Protection - Part 1: Code of Practice for Land and Marine Applications - (formerly CP 1021) (BS 7361-1:1991). British Standards Institution, London, 122 p.
211	BS4019:1974	4b	GEO2:4019-1	BSI (1974a) Specification for Core Drilling Equipment (BS4019:1974). Part I - Basic Equipment. British Standards Institution, London, 152 p.	BSI (2006) Geotechnical Investigation and Testing - Sampling Methods and Groundwater Measurements - Part 1: Technical Principles for Execution (BS EN ISO 22475-1:2006). British Standards Institution, London, 120 p.
211	CP2012:1974	1	GEO2:2012-1	BSI (1974b) Code of Practice for Foundations for Machinery (CP 2012:1974). Part I - Foundations for Reciprocating Machines. British Standards Institution, London, 36 p.	BSI (1974) Code of Practice for Foundations for Machinery (CP 2012:1974). Part I - Foundations for Reciprocating Machines. British Standards Institution, London, 36 p.
211	BS812:1975	2	GEO2:812-1	BSI (1975a) Methods for Sampling and Testing of Mineral Aggregates. Sand and Filters (BS812:1975). Part I - Sampling. Size. Shape and Classification. British Standards Institution, London, 24 p.	<i>[Delete all text.]</i>
211	BS1377:1975	3b	GEO2:1377-1	BSI (1975b). Methods of Test for Soil for civil Engineering Purposes (BS1377:1975), British Standards Institution, London, 144 p.	BSI (1990) Methods for test for soils for civil engineering purposes (BS 1377: Parts 1-9: 1990). British Standards Institution, London, 406 p.
211	BS1924:1975	3b	GEO2:1924-1	BSI (1975c) Methods of Test for Stabilized soils (BS1924:1975), British Standards Institution, London, 96 p.	<i>[Delete – replace citations with BS 1377:1990.]</i>
211	BS5493:1977	2	GEO2:5493-1	BSI (1977) Code of Practice for Protective Coating of Iron and Steel Structures Against Corrosion (BS5493:1977). British Standards Institution, London, 112 p.	<i>[Delete all text.]</i>
211	BS5930:1981	1	GEO2:5930-1	BSI (1981a). Code of Practice for Site Investigations (BS5930:1981). British Standards Institution, London, 148 p.	BSI (1981). Code of Practice for Site Investigations (BS5930:1981). British Standards Institution, London, 148 p.
211	BS6031:1981	3b	GEO2:6031-1	BSI (1981b) Code of Practice for Earthworks (BS6031:1981). British Standards Institution, London, 88 p.	BSI (2009) Code of practice for earthworks (BS 6031:2009). British Standards Institution, London, 120 p.
211	BS8004:1986	1	GEO2:8004-1	BSI (1986) British Standard Code of Practice for Foundations (BS8004: 1986). British Standards Institution, London, 150 p.	No change.
	Additional reference required.				BSI (2004) Eurocode 7. Geotechnical design. General rules (BS EN 1997-1:2004). British Standards Institution, London, 168 p.
	Additional reference required.				BSI (2007) Eurocode 7. Geotechnical design. Ground investigation and testing (BS EN 1997-2:2007). British Standards Institution, London, 196 p.
	Additional reference required.				BSI (2010) Code of practice for site investigations (BS 5930:1999+A2:2010). British Standards Institution, London, 192 p.
	Additional reference required.				BSI (2011a) Geotechnical Investigation and Testing - Field Testing – Part 2: Dynamic probing (BS EN ISO 22476-2:2005+A1:2011). British Standards Institution, London, 30 p.

## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
	Additional reference required.				BSI (2011b) Geotechnical Investigation and Testing - Field Testing – Part 3: Standard penetration test (BS EN ISO 22476-3:2005+A1:2011). British Standards Institution, London, 14 p.
	Additional reference required.				BSI (2012a) Geotechnical Investigation and Testing - Geohydraulic Testing - Part 2: Water Permeability Tests in a Borehole using Open Systems (BS EN ISO 22282-2:2012). British Standards Institution, London, 27 p.
	Additional reference required.				BSI (2012b) Geotechnical Investigation and Testing - Geohydraulic Testing - Part 3: Water Pressure Tests in Rock (BS EN ISO 22282-3:2012). British Standards Institution, London, 26 p.
	Additional reference required.				BSI (2012c) Geotechnical Investigation and Testing - Geohydraulic Testing - Part 4: Pumping tests (BS EN ISO 22282-4:2012). British Standards Institution, London, 25 p.
	Additional reference required.				BSI (2012d) Geotechnical Investigation and Testing - Geohydraulic Testing - Part 5: Infiltrometer Tests (BS EN ISO 22282-5:2012). British Standards Institution, London, 21 p.
	Additional reference required.				BSI (2012e) Geotechnical Investigation and Testing - Geohydraulic Testing - Part 6: Water Permeability Tests in a Borehole using Closed Systems (BS EN ISO 22282-4:2012). British Standards Institution, London, 15 p.
	Additional reference required.				BSI (2012f) Geotechnical Investigation and Testing – Field Testing, Part 1: Electrical cone and piezocone penetration test (BS EN ISO 22476-1:2012). British Standards Institution, London, 36 p.
	Additional reference required.				GEO (2001) Model Specification for Soil Testing (Geospec 3). Geotechnical Engineering Office, Hong Kong, 340 p.
	Additional reference required.				GEO (2002) Guide to Reinforced Fill Structure and Slope Design (Geoguide 6). Geotechnical Engineering Office, Hong Kong, 236p.
	Additional reference required.				Construction Standard CS3:2013, Aggregates for Concrete. The Government of the Hong Kong Special Administrative Region, Hong Kong 140p.
234	BS5930:1981 BS4019-1:1974	4b 4b	GEO2:5930-14 GEO2:4019-3	(2) For additional information, reference can be made to BS 4019:Part 1 (BSI, 1974a) on rotary core drilling equipment and Figure 29 of BS 5930 (BSI, 1981a).	(2) For additional information, reference can be made to BS EN ISO 22745-1:2006 (BSI, 2006).
235	BS5930:1981	3a	GEO2:5930-15	Note: Table taken from BS5930 (BSI, 1981a)	Note: Table taken from BS5930 (BSI, 2010)
237	BS5930:1981	4b	GEO2:5930-16	(3) Table taken from BS 5930 (BSI, 1981a).	(3) Table adapted from BS EN 1997-2:2007 (BSI, 2007).
240	BS1377:1975	4b	GEO2:1377-19	BS 1377 (BSI, 1975b) Test 1(A)	Geospec 3 (GEO, 2001) Clause 5
240	BS1377:1975	4b	GEO2:1377-20	BSI (1975b) Test 2(A) or 2(B) and Test 3	Geospec 3 (GEO, 2001) Clause 6
240	BS1377:1975	3b	GEO2:1377-21	BSI (1975b) Test 5	BS1377-2 (BSI, 1990b) Clause 6.5
240	BS1377:1975	4b	GEO2:1377-22	BSI (1975b) Test 6	Geospec 3 (GEO, 2001) Clause 7
240	BS1377:1975	4b	GEO2:1377-23	(a) BSI (1975b) Test 7(A)	(a) Geospec 3 (GEO, 2001) Clause 8
240	BS1377:1975	2 2	GEO2:1377-24 GEO2:1377-25	(a) Sieving gives the grading of soil coarser than silt. Care is required with soils derived from insitu rock weathering, to avoid crushing of soil grains during disaggregation. The standard method of dry sieving (BSI, 1975b Test 7(B)) is not recommended for general use in Hong Kong. As a variation to the standard method of wet sieving (BSI, 1975b Test 7(A)), it will be appropriate to exclude the use of dispersant when determining particle size distribution for certain applications, e.g. for designing filters, and in selecting fill for reinforced fill structures.	(a) Sieving gives the grading of soil coarser than silt. Care is required with soils derived from insitu rock weathering, to avoid crushing of soil grains during disaggregation. Dispersant should be excluded when determining particle size distribution for certain applications, e.g. for designing filters and selecting fill for reinforced fill structures.
240	BS1377:1975	4b	GEO2:1377-26	(b) BSI (1975b) Test 7(C) or 7(D)	(b) Geospec 3 (GEO, 2001) Clause 8
241	BS8006:1986	1	GEO2:8004-4	Assesses the potential for electrochemical corrosion of buried steel. The quoted reference gives a test method for compacted fill, as opposed to field measurement using the four electrode method (see Section 33.2.1). Corrosion of steel in soils is discussed in BS8004 (BSI, 1986) and King (1977).	No change

## Geoguide 2: Guide to Site Investigation

**Table D4 - Recommended Revisions to Existing Clauses referring to British Standards**

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating <sup>(1)</sup>	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
241	BS1377:1975	4b	GEO2:1377-27	BSI (1975b) Test 8	Geospec 3 (GEO, 2001) Clause 9-1
241	BS1377:1975	4b	GEO2:1377-28	(a) BSI (1975b) Test 9	(a) Geospec 3 (GEO, 2001) Clause 9.3
241	BS1377:1975	4b	GEO2:1377-29	Test 9 of BSI (1975b)	Geospec 3 (GEO, 2001) Clause 9.3
241	BS1377:1975	4b	GEO2:1377-30	(b) BSI (1975b) Test 10	(b) Geospec 3 (GEO, 2001) Clause 9.3
241	BS1377:1975	4b	GEO2:1377-31	BSI (1975b) Test 11(A)	Geospec 3 (GEO, 2001) Clause 9.5
241	CP1021:1973	4a	GEO2:1021-4	Assesses the likelihood of sulphate reducing bacteria being present, which promote microbiological corrosion of buried steel. The quoted reference gives a test method for compacted fill. as opposed to field measurement, which is described in <b>CP1021 (BSI, 1973)</b>	Assesses the likelihood of sulphate reducing bacteria being present, which promote microbiological corrosion of buried steel. The quoted reference gives a test method for compacted fill. as opposed to field measurement, which is described in <b>BS1377-9 (BSI, 1990a)</b>
241	CP1021:1973	2	GEO2:1021-5	Bacteriological tests <b>BSI (1973)</b> Undisturbed specimens should be stored in air- sealed. sterilized containers.	<i>[Delete whole row from Table 12]</i>
242	BS1377:1975	4b	GEO2:1377-32	(a) BSI (1975b) Test 21	Geospec 3 (GEO, 2001) Clause 15
242	BS1377:1975	4b	GEO2:1377-33	(a) BSI (1975b) Test 17	Geospec 3 (GEO, 2001) Clause 14
243	BS1377:1975	4b	GEO2:1377-34	BSI (1975b) Tests 12, 13 and 14	Geospec 3 (GEO, 2001) Clause 10
243	BS1377:1975	4b	GEO2:1377-35	BSI (1975b) Test 15	Geospec 3 (GEO, 2001) Clause 11; also under “Remarks” delete “Test 12 is commonly used in Hong Kong”
243	BS1377:1975	4b	GEO2:1377-36	BSI (1975b) Test 16	Geospec 3 (GEO, 2001) Clause 12
270	BS5930:1981	3a	GEO2:5930-17	Figures based on BS 5930 <b>(BSI,1981a)</b> and Penman (1986)	Figures based on BS 5930 <b>(BSI,2010)</b> and Penman (1986)
275	BS1377:1975	4a	GEO2:1377-37	(1) Figure based on <b>BS 1377 (BSI, 1975b)</b> .	(1) Figure based on <b>BS EN ISO 22476-3 (BSI, 2011b)</b> .
276	BS1377:1975	3a	GEO2:1377-38	Note: Figure based on <b>BS 1377 (BSI, 1975b)</b> .	Note: Figure based on <b>BS 1377-9 (BSI, 1990)</b> .
278	BS5930:1981	3a	GEO2:5930-18	Expressions come from Hvorslev (1951); figure based on BS 5930 <b>(BSI, 1981a)</b> .	Expressions come from Hvorslev (1951); figure based on BS 5930 <b>(BSI, 2010)</b> .
289	BS5930:1981	4a	GEO2:5930-19	(a) after <b>BS5930 (BSI, 1981a)</b> , (b) & (c) after Delft Soil Mechanics Laboratory (1977).	(a) after <b>BS EN ISO 22476-1 (BSI, 2012b)</b> , (b) & (c) after Delft Soil Mechanics Laboratory (1977).
293	BS5930:1981	3a	GEO2:5930-20	Figure adopted from Brown (1981) and BS 5930 <b>(BSI, 1981a)</b> .	Figure adopted from Brown (1981) and BS 5930 <b>(BSI, 2010)</b> .
358	BS5573:1978	3b	GEO2:5573-2	(c) <b>BS5573 : Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes (BSI, 1978)</b> . This describes the safety precautions that should be taken, the specific safety requirements for the equipment to be used, and the gas hazards which might be encountered in deep and large diameter boreholes.	(c) <b>BS8008 Safety precautions and procedures for the construction and descent of machine-bored shafts for piling and other purposes (BSI, 2008)</b> . This describes the safety precautions that should be taken, the specific safety requirements for the equipment to be used, and the gas hazards which might be encountered in deep and large diameter boreholes.
358	BS5573:1978	3b	GEO2:5573-1	BSI (1978) Code of Practice for Safety Precautions in the Construction of Large Diameter Boreholes for Piling and Other Purposes (BS5573 : 1978). British Standards Institution, London, 8p.	BSI (2008) Safety precautions and procedures for the construction and descent of machine-bored shafts for piling and other purposes (BS 8008:1996+A1:2008). British Standards Institution, London, 12 p.