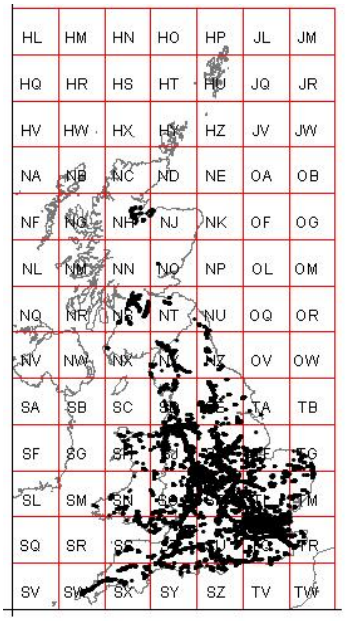
British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

The structure and operation of the BGS National Geotechnical Properties Database Version 2

IR/12/056

Land Use, Planning and Development

Internal Report



BRITISH GEOLOGICAL SURVEY

LAND USE, PLANNING AND DEVELOPMENT

INTERNAL REPORT

Keywords

Report; Geotechnical Properties, Database.

Front cover

Borehole distribution for National Geotechnical Properties Database

Bibliographical reference

SELF, S.J., ENTWISLE, D.C AND NORTHMORE, K.J. 2012. The structure and operation of the BGS National Geotechnical Properties Database Version 2. *British Geological Survey Internal Report* .IR/12/056

The structure and operation of the BGS National Geotechnical Properties Database Version 2

IR/12/056

Suzanne Self, David Entwisle and Kevin Northmore

Keyworth, Nottingham British Geological Survey 2012

BRITISH GEOLOGICAL SURVEY

The full range of Survey publications is available from the BGS Sales Desks at Nottingham, Edinburgh and London; see contact details below or shop online at www.geologyshop.com

The London Information Office also maintains a reference collection of BGS publications including maps for consultation.

The Survey publishes an annual catalogue of its maps and other publications; this catalogue is available from any of the BGS Sales Desks.

The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as its basic research projects. It also undertakes programmes of British technical aid in geology in developing countries as arranged by the Department for International Development and other agencies.

The British Geological Survey is a component body of the Natural Environment Research Council.

British Geological Survey offices

Keyworth, Nottingham NG12 5GG

☎ 0115-936 3241 Fax 0115-936 3488
e-mail: sales@bgs.ac.uk
www.bgs.ac.uk
Shop online at: www.geologyshop.com

Murchison House, West Mains Road, Edinburgh EH9 3LA

☎ 0131-667 1000 Fax 0131-668 2683
e-mail: scotsales@bgs.ac.uk

London Information Office at the Natural History Museum (Earth Galleries), Exhibition Road, South Kensington, London SW7 2DE

☎ 020-7589 4090 Fax 020-7584 8270
☎ 020-7942 5344/45 email: bgslondon@bgs.ac.uk

Forde House, Park Five Business Centre, Harrier Way, Sowton, Exeter, Devon EX2 7HU

☎ 01392-445271 Fax 01392-445371

Geological Survey of Northern Ireland, Colby House, Stranmillis Court, Belfast BT9 5BF

☎ 028-9038 8462 Fax 028-9038 8461

Maclean Building, Crowmarsh Gifford, Wallingford, Oxfordshire OX10 8BB

☎ 01491-838800 Fax 01491-692345

Columbus House, Greenmeadow Springs, Tongwynlais, Cardiff, CF15 7NE

☎ 029–2052 1962 Fax 029–2052 1963

Parent Body

Natural Environment Research Council, Polaris House, North Star Avenue, Swindon, Wiltshire SN2 1EU

☎ 01793-411500 Fax 01793-411501
www.nerc.ac.uk

Foreword

This report describes the development history, structure, content and planned future developments of the BGS National Geotechnical Properties Database.

Sections 1 and 2 review the history of the database and its progressive development from stand-alone project databases in proprietary software packages, to a unified MS Access database and finally to its current status as a corporate BGS Oracle database. Discussion is also made of the introduction of the Association of Geotechnical and Geoenvironmental Specialists (AGS) common Data Interchange Format, now accepted as industry standard, which required modification and upgrading of the Geotechnical Properties Database to enable digital data entry.

Section 3 explains the current structure of the database and includes descriptions of the database tables and their relationships, the type and number of data records currently held and their distribution across the UK.

Section 4 describes the methods of data entry (manual and digital) and data extraction.

Section 5 provides a final section describing planned future developments to enhance ease of access to, and promote wider use of, the database information for a variety of applications.

Acknowledgements

The authors would like to thank Jon Hallam for his work in initially setting up the database, obtaining much of the early data through his contacts within the geotechnical community and his forward thinking in restructuring the data to model AGS data, and Margaret Slater for her many years of efficient and accurate data entry.

Contents

FIGURES

TABLES

Summary

The main part of this report describes the development history, structure and content of the BGS National Geotechnical Properties Database, with a final section describing planned future developments to enhance ease of access to, and promote wider use of, the database information for a variety of applications.

The National Geotechnical Properties Database primarily holds geotechnical information extracted from site investigation records provided by clients, consultants and contractors, and from field and, secondarily, from laboratory test results carried out by the British Geological Survey. Information held within the database includes locations to British National Grid Coordinates; borehole, core and *in situ* test data; sample data; and a range of laboratory index, mechanical properties and chemical test data on soils, rocks and water. The database tables and fields are designed to be compatible with data supplied in the Association of Geotechnical and Geoenvironmental Specialists (AGS) industry standard digital transfer format, enabling rapid addition of data electronically, in addition to manual entry of analogue legacy data. This information forms the basis for the geotechnical attribution of the 2D and 3D digital geological models and underpins BGS core and commissioned engineering geology research. It also provides an important information resource for external customers and internal/external enquiries.

The role of Geotechnical Database Manager has been undertaken by Suzanne Self since 2000.

1 Introduction

The National Geotechnical Properties Database contains data obtained from site investigation reports. It contains data relating to the report, the boreholes within the report, in situ borehole measurements and results of tests taken on samples from the boreholes. The database also holds descriptions and data obtained from field or geotechnical laboratory tests undertaken in-house as part of BGS project investigations. The database is relatively large, consisting of 54 data tables and 33 dictionary tables. This report describes the evolution of the database to its current state, and the structure and content of the database.

2 Database History

The UK Geotechnical Properties Database primarily contains data extracted from Site Investigation Reports produced by commercial geotechnical contractors for various clients.

In the mid-1980's a coherent series of flat-file geotechnical datasets were generated as part of the applied geology mapping projects centred on Exeter, Deeside, Coventry, Nottingham, Bath, Castleford/Pontefract and the Black Country, and geological mapping of the Thame 1:50k sheet. For each of these projects data were abstracted from the available Site Investigation Reports within the mapping area. Some of the required site investigation reports were held in the BGS collection while additional reports were acquired or loaned from other sources. Information was collected on the site investigation reports (e.g. report number, job title, client/contractor details, etc.), boreholes, samples and the most commonly measured geotechnical parameters and stored on paper coding sheets. This set of data is titled *'Geotehnical Data from Applied Geology Projects'* on the BGS Discovery Metadata System.

In the late 1980's, following on from these early data collections, a further series of datasets were created for the applied mapping project areas of Wrexham, Leeds, SW Essex and Stoke. The data for each project was stored on a paper datasheet that was later input to a computerised spreadsheet (usually utilising 'SMART'© commercially available software) replicating the design of the paper datasheets. These spreadsheets were later combined, restructured and the data stored as a project database.

The project databases essentially comprised a table containing details of the *Site Investigation Report* linked to a table containing details of the *Boreholes* within the report via the BGS Site Investigation Number. The borehole table was then linked to a table containing details of the *Samples* from each borehole via the BGS borehole registration number. The sample table contained information such as the depth of the sample and codes representing the lithostratigraphy and lithology of the sample. The sample table was in turn linked to a series of tables containing *Geotechnical Measurements* undertaken on the sample via the BGS registration number and the sample depth These tables are now stored on Oracle as tables prefixed by ENGGEOL.GEOTECHDB2 and can be found on the BGS Discovery Metadata titled *'Geotechnical Database: Leeds/Stoke/Wrexham/ SW Essex'*.

In 1990/91 the 'Engineering Geology of UK Rocks and Soils' (EGRS) sub-programme (or theme) was initiated under the Urban Geoscience and Geological Hazards (UGGH) Programme, with the aim of characterizing the engineering properties and behaviour of key geological

formations of particular relevance to planning and engineering development.[1]. The first unit studied was the Gault Formation. A geotechnical database necessary to underpin the study of this deposit was created in Microsoft Access with the same structure as the previously described project database. Data from site investigation boreholes located within the Gault Formation outcrop were extracted from Site Investigation Reports and manually entered into the database.

In c.1992 the Association of Geotechnical and Geoenvironmental Specialists (AGS) established a common Data Interchange Format that was widely accepted by the geotechnical community and meant that data presented in site investigation reports could be recorded and transferred electronically. This provided a means for large amounts of data to be received digitally in AGS format and entered into the database without the need for retyping. Redesign of the Microsoft Access database was undertaken in order to maximise compatibility with data acquired in the AGS format. The main differences between the original geotechnical database and the current AGS compatible database are:

- A code identifying the contractor of the report and the contractors report number are used to uniquely identify the report rather than the BGS Site Investigation Number.
- The contractors borehole number is used to identify the borehole rather than the BGS borehole registration number
- The geology (lithology, stratigraphy) is stored in a table containing stratum descriptions for depth intervals down a borehole rather than in a table with the sample descriptions.
- Some additional geotechnical parameters were added to the database

The Gault data were updated into the new database format as part of the 'Engineering Geology of UK Rocks and Soils (EGRS)' sub-programme requirements. The original project databases for Wrexham, Leeds, SW Essex and Stoke have since been fully or partially incorporated into the main database. SW Essex and Wrexham have been fully incorporated, while Leeds and Stoke still have the geology attached to samples rather than borehole depth intervals. In addition to the Gault Formation project, geotechnical property data has subsequently been entered into the database for the Mercia Mudstone, Lambeth and Lias groups, and Quaternary Loessic Brickearth deposits, all of which having formed part of the EGRS project studies. Data acquisition and entry continues for a current study of glacial till deposits. Data has also been entered for the urban areas of Manchester, Clyde Basin, Thames Gateway, East London and Mersey Corridor in order to undertake assessments of ground behaviour and property attribution of constructed 3D digital geological models. Plasticity values have been entered as part of the Ground Shrinkage Hazards project undertaking research into the shrink-swell behaviour of UK clays and mudstones under the Land Use and Development Theme (formerly Physical Hazards Programme). Since restructuring of the database to accept AGS digital data, the practice of inputting all data from site investigation boreholes acquired for specific formation studies or geographical areas has been followed. This has resulted in the database containing a significant amount of geotechnical data for geological formations and deposits over and above those referred to above. In 2001 the database was extended to include selected hydrogeological data necessary for the Manchester project and also to include some additional AGS parameter groups. The database was then made available as a BGS ORACLE database and can be found on the BGS Discovery Metadata titled *'Geotechnical Database'*.

In 2003 the database was upgraded in order that data could be entered directly into the oracle tables and corporate audit triggers were added. The dictionary tables were redesigned to meet

[1] This research continues as part of BGS's on-going core research programme within the BGS structure, operating under the project title of 'Geotechnical and Geophysical Properties and Processes' as part of the Land Use, Planning and Development Theme.

corporate standards. The data table names were prefixed by BGS.GTCH2003 and the dictionary tables by BGS.DIC_GTCH2003.

In 2009 the most recent changes were implemented to the database in order for it to comply with current BGS corporate standards. The data table names are now prefixed by BGS.GTCH_ and the dictionary tables by BGS.GTCH_DIC.

3 Current Database

3.1 THE STRUCTURE OF THE DATABASE

The database was designed as a stand-alone AGS digital data transfer format compatible database (AGS, 1999) for use within the 'Engineering Geology of UK Rocks and Soils' and 'Ground Information for Sustainable Development' sub-programmes, which are the prime users of the data and through which the database was populated. Although the geotechnical database can be linked to other BGS databases there are some issues of overlap and duplication between this database and BGS corporate tables such as the BGS Site Investigation Report table called BGS.BGS_SI, the SINGLE ONSHORE BOREHOLE INDEX BGS.SOBI (SOBI) and BGS.BOREHOLE_GEOLOGY (BOGE), these are discussed later.

The database was designed, as far as possible, to mirror the design of data received in AGS format with each table in the database representing an AGS data group. However, in the current database not all of the AGS data groups are represented by a table. This is because they were not adjudged to hold data that were directly relevant to BGS projects. Similarly not all of the fields for each AGS data group are represented in a database table. In other instances some AGS data groups are represented in a database table but the data is reformatted into different fields in order to more readily perform statistical analyses.

The outline structure of the database is shown in Figure 1. The parent table to the database is the ***Site Investigation Report Table*** containing details about the report from which the geotechnical data is extracted, such as the report name, date and a confidentiality code. The key field that uniquely identifies each Site Investigation Report is an automatically generated sequence number (GTCH_PROJ_ID). If the report from which data is extracted was stored in the National Geological Records Centre (NGRC) a field (SI_ID) identifying the BGS Site Investigation Report Number will also be stored in this table.

The Site Investigation Report Table is in turn linked by the sequence number (GTCH_PROJ_ID) to a ***Borehole Table*** giving details about the boreholes stored within the report. Each borehole is uniquely identified by an automatically generated sequence number (GTCH_HOLE_ID). Information stored about each borehole includes the contractor's borehole number, its location, final depth and ground level. There is also a field in the borehole table (BGS_ID) which enables it to be linked to SOBI as long as the borehole has been registered by NGRC. Boreholes that do not have BGS registration numbers (such as data added from AGS digital data transfer format prior to SOBI, or for trial pits that were not registered along with boreholes from SI reports) are sent to NGRC for registering. Although there can be a significant delay in obtaining the BGS registration numbers the data can still be interrogated and used prior to the number allocation.

Geological information for each borehole is stored in a ***Geology Table*** containing lithostratigraphy and lithology codes and text descriptions for depth intervals down the borehole. The codes used to identify the lithostratigraphy are from the BGS lexicon. The Geology Table is linked to the Borehole Table by GTCH_HOLE_ID and each record is uniquely identified by a

depth value for the top and base of each stratum description. In addition to the Geology Table there are a series of other ***Interval Measurements Tables*** containing measurements taken over depth intervals down each borehole, including core information, fracture information and standard penetration tests, etc. These are also linked to the Borehole Table by GTCH_HOLE_ID.

For each borehole a series of samples may have been taken for which geotechnical measurements have been made. Details about these samples such as the top and base depths and a code describing the type of sample are stored in a ***Sample Table***. The sample table is linked to the Borehole Table via GTCH_HOLE_ID. Each sample is uniquely identified by an automatically generated sequence number (GTCH_SAMP_ID). It is possible to link the Sample Table back to the Geology Table using depths to see which geological unit the sample falls within.

A series of tables containing ***Geotechnical Measurements*** taken on the samples are linked to the sample table by GTCH_SAMP_ID.

The relationship between the Sample Table and the Geotechnical Measurements table may be 1:1 or 1:many depending on the type of test. The general entity relationships within the database are outlined in Figure 2.

All of the fields within the tables that contain codes are linked to a set of DICTIONARY TABLES which provide a translation of the codes.

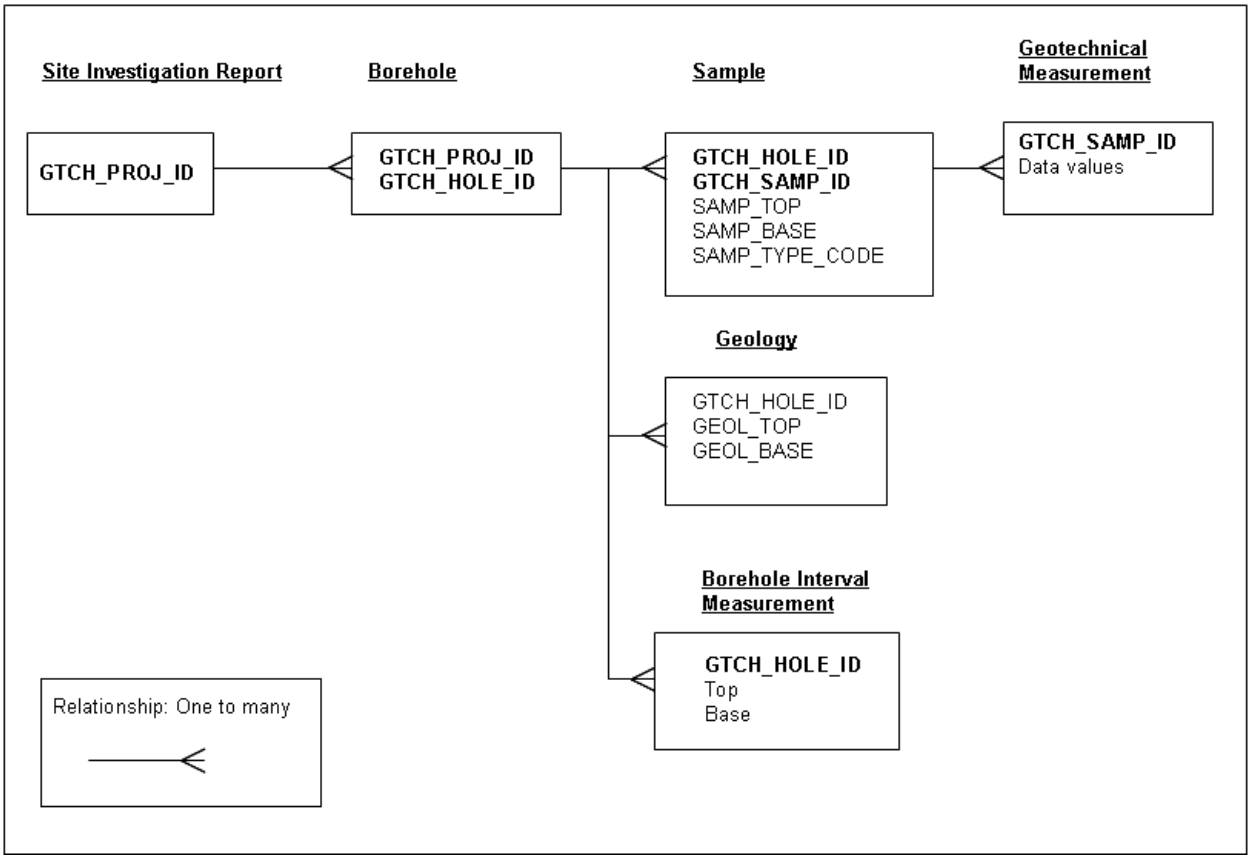


Figure 1. Simplified diagram of the National Geotechnical Database structure

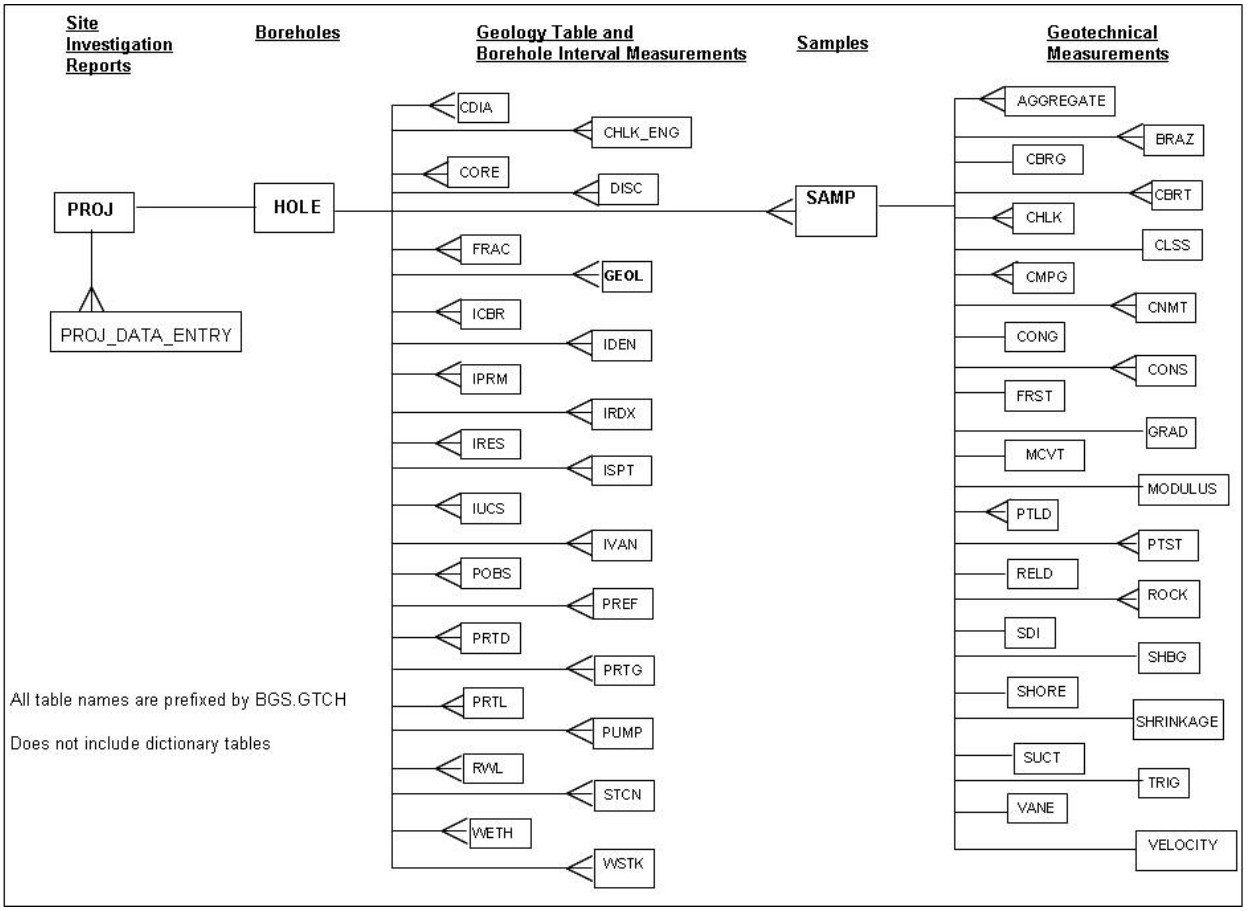


Figure 2. Entity relationship diagram for the National Geotechnical Database

3.2 LIST OF GEOTECHNICAL DATABASE TABLES

All the tables have an associated history table, which is automatically populated by an audit trigger when any data is updated or deleted. The tables have a trigger (_PKX) which prevents the primary key from being updated this is standard BGS procedure. The tables are listed below and the detailed content presented in Appendix1.

BGS.GTCH_AGGREGATE (Rock Testing – Aggregate results)

BGS.GTCH_BRAZ (Rock Testing – Brazillian tensile strength results)

BGS.GTCH_CBRG (CBR test – general)

BGS.GTCH_CBRT (CBR test)

BGS.GTCH_CDIA (Casing diameter by depth)

BGS.GTCH_CHLK (Chalk tests)

BGS.GTCH_CHLK_ENG (Chalk engineering properties)

BGS.GTCH_CLSS (Classification tests)

BGS.GTCH_CMPG (Compaction tests – general)

BGS.GTCH_CNMT (Contaminant and chemical testing)

BGS.GTCH_CONG (Consolidation test – general results)

BGS.GTCH_CONS (Consolidation test results – for each stage of test)

BGS.GTCH_CORE (Rotary core information)

BGS.GTCH_DISC (Discontinuity data)

BGS.GTCH_FRAC (Fracture spacing)

BGS.GTCH_FRST (Frost susceptibility)

BGS.GTCH_GEOL (Stratum descriptions)

BGS.GTCH_GRAD (Particle size distribution analysis data)

BGS.GTCH_HOLE (Hole information)

BGS.GTCH_ICBR (In situ CBR test)

BGS.GTCH_IDEN (In situ density test)

BGS.GTCH_IPRM (In situ permeability test)

BGS.GTCH_IRDX (In situ redox test)

BGS.GTCH_IRES (In situ resistivity test)

BGS.GTCH_ISPT (Standard penetration test results)

BGS.GTCH_IUCS (In situ UCS test)

BGS.GTCH_IVAN (In situ vane test)

BGS.GTCH_MCVT (MCV test)

BGS.GTCH_MODULUS (Rock testing – Modulus related test results)

BGS.GTCH_POBS (Piezometer readings)

BGS.GTCH_PREF (Piezometer installation details)

BGS.GTCH_PROJ (Project details)

BGS.GTCH_PROJ_DATA_ENTRY (Data entry details)

BGS.GTCH_PRTD (Pressuremeter test data)

BGS.GTCH_PRTG (Pressuremeter test results, general)

BGS.GTCH_PRTL (Pressuremeter test results, individual loops)

BGS.GTCH_PTLD (Point load tests)

BGS.GTCH_PTST (Laboratory permeability tests)

BGS.GTCH_PUMP (Pumping test)

BGS.GTCH_RELD (Relative density test)

BGS.GTCH_ROCK (Rock testing)

BGS.GTCH_RWL (Rest water level data)

BGS.GTCH_SAMP (Sample reference information)

BGS.GTCH_SDI (Rock Testing – Slake Durability Index)

BGS.GTCH_SHBG (Shear box testing – general)

BGS.GTCH_SHORE (Rock Testing – Shore hardness)

BGS.GTCH_SHRINKAGE (Shrinkage Tests)

BGS.GTCH_STCN (Static cone penetration test)

BGS.GTCH_SUCT (Suction tests)

BGS.GTCH_TRIG (Triaxial tests)

BGS.GTCH_VANE (Sample vane tests)

BGS.GTCH_VELOCITY (Rock Testing – P-wave and S-Wave velocity measurements)

BGS.GTCH_WETH (Weathering grades)

BGS.GTCH_WSTK (Water strike details)

3.3 DICTIONARIES

The dictionaries are listed below with detailed content given in Appendix 2.

BGS.DIC_ GTCH_CBRG_COND (CBR condition)

BGS.DIC_GTCH_CBRG_METH (CBR method)

BGS.DIC_GTCH_CHLK_DEN (Chalk Density)

BGS.DIC_GTCH_CHLK_FLINTS (Chalk flint content)

BGS.GTCH_CHLK_GRAD (Chalk Grade)

BGS.DIC_GTCH_CMPG_TYPE (Compaction type)

BGS.DIC_GTCH_CNMT_TEST_TYPE (Contaminant test type)

BGS.DIC_GTCH_CNMT_TYPE (Contaminant determinand test type)

BGS.DIC_GTCH_CONG_COND (Consolidation condition)

BGS.DIC_GTCH_CONG_TYPE (Consolidation type)

BGS.DIC_GTCH_CVT (CV type)

BGS.DIC_GTCH_DATE_ACCURACY (Date accuracy)

BGS.DIC_GTCH_DISC_TERM (Discontinuity termination)

BGS.DIC_GTCH_DISC_TYPE (Discontinuity Type)

BGS.DIC_GTCH_DISCONTINUITY (Discontinuity)

BGS.DIC_GTCH_DRILLING_METHOD (Drilling Method)

BGS.DIC_GTCH_FEATURES (Features)

BGS.DIC_GTCH_HOLE_LOCM (Location method)

BGS.DIC_GTCH_IPRM_TYPE (In situ permeability test type)

BGS.DIC_GTCH_IRES_TYPE (In situ resistivity test type)

BGS.DIC_GTCH_ISPT_TYPE (In situ standard penetration test type)

BGS.DIC_GTCH_LITHOSTRAT (Lithostratigraphy)

BGS.DIC_GTCH_PLTF (Point load test type)

BGS.DIC_GTCH_PRTD_TYPE (Pressuremeter type)

BGS.DIC_GTCH_PTST_COND (Laboratory permeabilty sample condition)

BGS.DIC_GTCH_RWL_ACCURACY (Resting Water Level Accuracy)

BGS.DIC_GTCH_SAMP_TYPE (Sample type)

BGS.DIC_GTCH_SHBG_TYPE (Shear box test type)

BGS.DIC_GTCH_STCN_TYPE (Static cone test type)

BGS.DIC_GTCH_SUCT_METH (Suction test method)

BGS.DIC_GTCH_TRIG_COND (Triaxial sample condition)

BGS.DIC_GTCH_TRIG_TYPE (Triaxial test type)

BGS.DIC_GTCH_TRIX_MODE (Triaxial mode of failure)

3.4 NUMBER OF RECORDS STORED IN THE DATABASE

Table 1 presents a list of the number of data records for each database table up to March 2011.

Table 1. Number of data records for the National Geotechnical Properties Database tables (up to March 2011).

BGS.GTCH_AGGREGATE	146
BGS.GTCH_BRAZ	1649
BGS.GTCH_CBRG	4011
BGS.GTCH_CBRT	2977
BGS.GTCH_CDIA	9359
BGS.GTCH_CHLK	7392
BGS.GTCH_CHLK_ENG	1306
BGS.GTCH_CLSS	211635
BGS.GTCH_CMPG	5302
BGS.GTCH_CNMT	418179
BGS.GTCH_CONG	10756
BGS.GTCH_CONS	51092
BGS.GTCH_CORE	60053
BGS.GTCH_DISC	8906
BGS.GTCH_FRAC	27522
BGS.GTCH_FRST	41
BGS.GTCH_GEOL	403079
BGS.GTCH_GRAD	44090
BGS.GTCH_HOLE	80947
BGS.GTCH_ICBR	430
BGS.GTCH_IDEN	269
BGS.GTCH_IPRM	2720
BGS.GTCH_IRDX	30
BGS.GTCH_IRES	21
BGS.GTCH_ISPT	186422
BGS.GTCH_IUCS	38

BGS.GTCH_IVAN	11459
BGS.GTCH_MCVT	2692
BGS.GTCH_MODULUS	414
BGS.GTCH_POBS	20034
BGS.GTCH_PREF	4626
BGS.GTCH_PROJ	4138
BGS.GTCH_PROJ_DATA_ENTRY	4100
BGS.GTCH_PRTD	32385
BGS.GTCH_PRTG	337
BGS.GTCH_PRTL	665
BGS.GTCH_PTLD	25543
BGS.GTCH_PTST	349
BGS.GTCH_PUMP	38
BGS.GTCH_RELD	130
BGS.GTCH_ROCK	10975
BGS.GTCH_RWL	4076
BGS.GTCH_SAMP	319601
BGS.GTCH_SDI	79
BGS.GTCH_SHBG	1869
BGS.GTCH_SHORE	0
BGS.GTCH_SHRINKAGE	580
BGS.GTCH_STCN	216052
BGS.GTCH_SUCT	238
BGS.GTCH_TRIG	45778
BGS.GTCH_VANE	3463
BGS.GTCH_VELOCITY	132
BGS.GTCH_WETH	20265
BGS.GTCH_WSTK	15199

3.5 DISTRIBUTION OF DATA

The national coverage of all data held in the National Geotechnical Properties Database, as indicated by the distribution of all site investigation boreholes from which geotechnical data have been extracted and entered into the database, is shown in Figure 3. Examples of data coverage are shown respectively in Figures 4 to 6 for data from boreholes from AGS data acquisitions, manually added data for the Physical Hazards UK Rocks and Soils projects, and plasticity data acquired for the Geohazards Shrink/swell project up to March 2011.

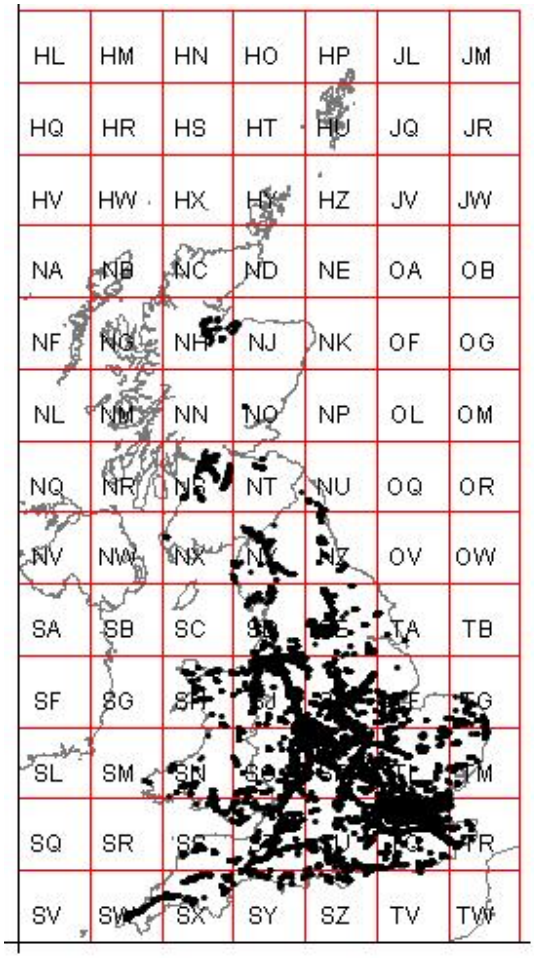


Figure 3. Distribution of all data held in the National geotechnical properties database (up to March 2011).

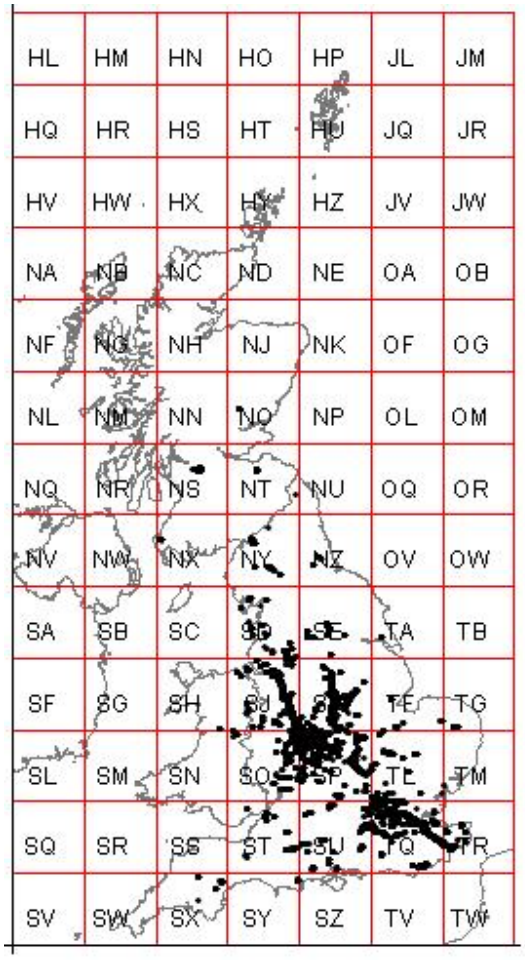


Figure 4. Distribution of AGS format acquired data (up to March 2011)

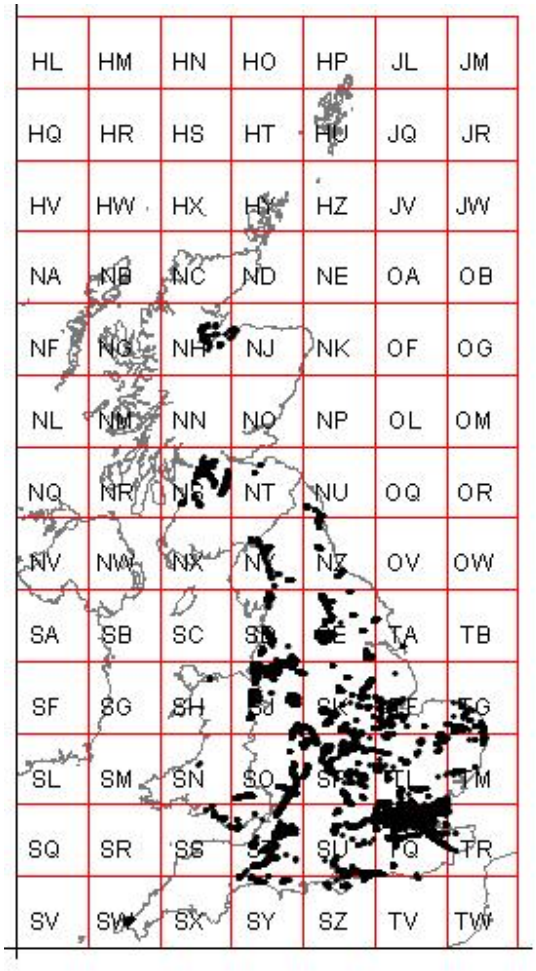


Figure 5. Distribution of manually entered data for UGGH/PH Projects (up to March 2011)

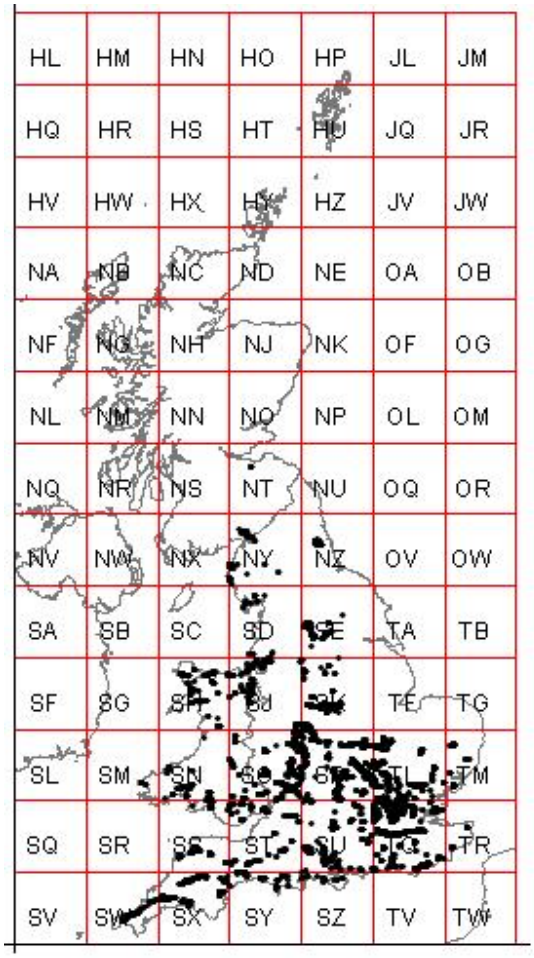


Figure 6. Distribution of plasticity data for top 5m only up to March 2011 for shrink/swell hazard assessment studies.

4 Data Entry

4.1 DATA SELECTION

Data is primarily entered into the database on a project basis, therefore, the initial selection of site investigation reports to be input is based upon the needs of the project and funding the data entry, i.e. reports with boreholes containing rock and soil formations to be studied or reports from within a geographical study area. Before it can be entered into the database the report must meet the following criteria:

- All of the boreholes within the report must have British National Grid coordinates
- The geology for each borehole must be interpreted or confirmed by a BGS geologist
- The geotechnical measurements must conform to industry standards (BS1377, 5930 etc). All values conforming to the standard are loaded. However, on later analysis some data may be shown to be erroneous and subsequently deleted.

Much of the data entered are derived from large reports conducted for major trunk road construction schemes and other major engineering projects. Where available, preference is given to AGS digital data transfer format and the most recent reports from major contractors. In order to optimise population of the database, the current procedure is to enter geotechnical data for *all* soil and rock formations presented in individual site investigation reports in addition to that pertaining to formations relevant to specific studies.

All data received in AGS digital data transfer format is electronically loaded into the database.

4.2 DATA CONFIDENTIALITY

All data entered into the database is subject to the instructions/licence conditions agreed with the owners of the data. Fields (CONFIDENTIALITY_CODE and ACCESSUSE_CODE) are present in the database (BGS.GTCH_PROJ) to enable codes to be entered stating whether the report is confidential or non-confidential and the conditions of use of the data. As a general rule all data supplied to BGS can be used internally for scientific research. Where agreed with the owner confidential reports may be used to aid geological interpretation and to assist in its geological mapping programme, therefore, the data can be used as part of an interpretation where it is not specifically identified. If an external enquiry is made regarding site specific information no reference will be made to confidential or otherwise restricted data and the reports, or parts thereof, will not be reproduced unless permission is sought from and given by the owners of the data (e.g. the client who commissioned the report).

In response to rulings from the Department of Justice (formerly the Lord Chancellor's Office), the Information Commissioner's Office, and guidance from The National Archives, and in the interests of maximising access to this economically valuable data source a decision has been reached to have a general release of confidentiality on Site Investigation and Drilling Information which has been deposited with BGS more than 4 years ago, except where there are valid reasons for the confidentiality status remaining in place. The exemptions and exceptions stated in the Freedom of Information Act and Environmental Information Regulations will be the basis for assessing the validity of retaining confidentiality, which means, effectively, the owner of the data will need to demonstrate that it would adversely affect their company interests should the release take place.

The geotechnical database can be linked to the BGS Site Investigation Report database and SOBI to identify confidentiality.

It is the responsibility of BGS staff utilising data from the geotechnical database, for whatever reason, to check the conditions of use and release of the data.

4.3 MANUAL DATA ENTRY

Manual data entry involves keyboard entry of all relevant data from the site investigation reports into the database.

The data is entered via a Microsoft Office Access2003 form, available on the corporate project workspace computer drive (W: drive), directly into the BGS Oracle tables.

Originally, due to time constraints, when data were manually entered for formation-specific studies only the data pertinent to that formation were entered into the database, with the type of data entered being determined by project leaders. For example, for some projects a lithostratigraphic code only may have been required to describe the geology for a depth interval down a borehole, while for other projects a full text description may have been required.

Similarly some projects required all geotechnical measurements to be entered, while the Shrink-swell project, for example, required only plasticity values for the top 5 m. Therefore, reports within the database were entered to different standards. It was recognised that this was short-sighted in terms of efficient population of the database and current procedure is to enter all of the extractable data from a site investigation report acquired for a particular formation-based study including full text descriptions for the geology.

4.4 DIGITAL DATA ENTRY

Digital data entry is possible when site investigation reports are received in the adopted industry standard AGS digital data transfer format. The reports are received via the BGS National Geological Records Centre (NGRC) where they loaded onto the S drive or from the Highways Agency Geotechnical Data Management System (HAGDMS) platform. The data for each report in AGS format are stored in a comma and quotes delimited ASCII file.

Originally, AGS data were loaded by opening the files as an Excel spreadsheet. Each AGS data group was separated onto a sheet within the Excel workbook, with each sheet representing a database table. The data was then reformatted where required and data checks carried out to ensure, for example, that:

- All codes used are valid
- All data values fall within appropriate ranges
- No duplicate values exist
- All referential integrities are maintained

The validated spreadsheets were then imported into Microsoft Access and appended onto the appropriate tables.

An automated system to load the data onto the AGS Oracle schema is now used and is found at http://KWNTSbeta:82/JAWS/agsloader; the data can then be mapped from the AGS schema to the BGS schema.

4.5 DATA EXTRACTION

The data can be queried using SQL or an MSAccess ‘front end’ query command. An Access data retrieval query form is available on the W drive, the results from which can be exported into MSExcel and fed into statistical analysis packages as required. To aid data selection, a location plot of the geotechnical boreholes for which data are held in the National Geotechnical Properties Database is available on the Intranet as part of the Geoscience Data Index (GDI).

5 Future Developments

5.1 INCORPORATING GEOTECHDB1 AND GEOTECHDB2 INTO THE GEOTECHNICAL DATABASE

Most of the suitable data held on paper coding sheets and GEOTECHDB2 (see section 2, Database History) has been reformatted and added the database. The main difficulty with converting these older databases into the current format is that the geology needs to be recoded to be borehole-interval based rather than sample based. This time-consuming task has been carried out for the SW Essex database and Wrexham. It still needs to be done for Ayrshire, Leeds and Stoke.

5.2 EXTENDING THE DATABASE TO INCLUDE BGS LABORATORY DATA AND DATA FROM REFERENCES

Geotechnical measurements obtained from the BGS laboratories are being added to the Geotechnical Database on a routine basis (for example, current studies on loessic brickearth where much collapse settlement data is acquired by in-house laboratory testing). Some measurements may be taken on samples that do not come from boreholes and may not in all instances be written up in reports. Thought needs to be given as to how best they can be incorporated into the database. Some published references also contain geotechnical data that is relevant to studies of particular formations or deposits but does not neatly fit into the database structure. Again a strategy needs to be developed as to the best way of dealing with this type of data, if it is considered to be necessary to include.

5.3 UTILISE THE AUTOMATED AGS LOADING FACILITY

Procedures need to be developed to ensure that all AGS files held by BGS are loaded onto the National Geotechnical Properties Database as a matter of course. A new data flow plan and loader are being developed to deal with digital data when it begins to arrive in AGS4 format.

5.4 REMOVE DUPLICATION OF OTHER BGS CORPORATE TABLES

Three tables in the geotechnical database have obvious overlap and duplication with BGS corporate tables, these are:

- The Site Investigation Report table (BGS.GTCH_PROJ) with the BGS Site Investigation Report table (BGS.BGS_SI) (see Table 2)
- The Borehole Details Table (BGS.GTCH_HOLE) with BGS.SOBI (see Table 3)
- The Geology Table (BGS.GTCH_GEOL) with BGS.BOREHOLE_GEOLOGY (see Table 4).

Ideally, the main BGS tables should replace the National Geotechnical Properties Database tables. However, although this is theoretically possible, in practise significant work would be required on both sets of tables before this could happen. For this reason in 2000 the Information Management Project decided that the Geotechnical Database had a sound business case for keeping the tables separate for the time being. Also, to replace the geotechnical database tables with the BGS tables would significantly slow down data query retrieval times.

Data in BGS.GTCH_GEOL from registered boreholes is periodically loaded into BGS.BOREHOLE_GEOLOGY. This means that the data is duplicated but it is available to a wider range of applications.

Table 2. Reasons for not currently using BGS.BGS_SI in the geotechnical database.

Reason for not using BGS table	Work needing to be done in order to use BGS table
Not all of the Site Investigation Reports have BGS Site Investigation numbers	Reports not held by BGS (i.e. Reports which are loaned to BGS, the data extracted and then returned) would need Site Investigation Report Numbers, or else unregistered reports would need to be deleted from the database.
Some Site Investigations are registered under more than one Site Investigation Report Number	Duplications within the database would need to be removed
No means of linking the report table to the Borehole table	Although a SIREPNO field has now been added to SOBI, the site_prefix field needs adding to make the field unique in BGS.BGS_SI, or this field needs replacing with SI_ID.

Table 3. Reasons for not currently using BGS.SOBI in the geotechnical database.

Reason for not using BGS table	Work needing to be done in order to use BGS table
Not all of the boreholes in the Geotechnical Database are registered.	There can be a significant delay in borehole registration in NGRC, this would need to be greatly speeded.
Sometimes more than one borehole may have been given the same registration number,	Sometimes grouped boreholes are registered together and would need to be individually registered. (This verification is ongoing)
Sometimes one borehole has more than one registration number, e.g. a borehole started as a cable percussion borehole and continued depth as a rotary core borehole may have been registered as two separate boreholes.	Discrepancies would need to be removed from the database.
The BGS ID is not used as a key field to link to the rest of the Geotechnical Database.	The database would need to be redesigned using the registration number as a key. The registration number would need to be added to all AGS tables or a table linking SOBI to the rest of the tables in the database would need to be added.
Some of the grid references received in AGS format are accurate to tenths of metres, whereas the in SOBI is to the nearest metre. Sometimes the grid references given by the contractor are different to those in SOBI.	Discrepancies between grid references would need to be sorted out and recorded to a greater accuracy in SOBI.
Null values for the final depth in SOBI.	Null values in SOBI would need to be populated.
Values for ground level and/or final depth in the Geotechnical Database may be different to those in SOBI.	Discrepancies would need to be sorted out.
Additional fields exist in the Geotechnical Database	The additional fields would need to be

that are not in SOBI. These are *remarks*, *orientation*, *inclination*, *stability*, *location method*, *hole type* and *type change*. The additional fields are mostly from AGS data.	added to SOBI or a table would need to be created containing all the fields which are not duplicated by SOBI.

Table 4. Reasons for not currently using BGS.BOREHOLE_GEOLOGY in the geotechnical database.

Reason for not using BGS table	Work needing to be done in order to use BGS table
Not all of the boreholes are registered and the registration number is a key field in the BGS.BOREHOLE_GEOLOGY table.	All of the boreholes need to be registered
The Geotechnical Database geology table contains fields additional to BGS.BOREHOLE_GEOLOGY, i.e. Uncertainty, features, discontinuities, colour and consistency.	New fields would need to be added to BGS.BOREHOLE_GEOLOGY or a table created containing these additional fields.
There can be more than one geological interpretation for each borehole.	The correct interpretation needs to be identified. Interpretations from the geotechnical database can be identified by the content_code 'GX'

5.5 CREATE A USER-FRIENDLY INTERFACE TO THE DATA

Currently a data query system has been developed in MSAccess to allow data to be selected by area, type and geology. A future development could be to rewrite the system in Cold Fusion and add it to the Intranet as part of the IDA system. Alternatively, a GIS retrieval system could be developed. This is currently being investigated by the PropBase project with a view to providing a graphical interface allowing a map based search.

6 Conclusions

From its inception in the mid 1980's as a 'stand-alone' project database, the current BGS National Geotechnical Properties Database is now of corporate importance. It is the key tool for the geotechnical attribution of 2D and 3D digital geological models, underpins BGS core and commissioned applied engineering geology research and provides an important information resource for external customers and internal/external enquiries. The current database is highly populated and well-defined and has developed, and is still developing, to best meet future project and corporate requirements.

Following the introduction of a common Data Interchange Format in c.1992 by the Association of Geotechnical and Geoenvironmental Specialists (AGS), whereby data presented in site investigation reports could be recorded and transferred electronically, the initial database underwent major restructuring to align data tables and fields to the new AGS format. Now widely accepted by the geotechnical community the AGS-compatible restructuring has proved remarkably foresighted, enabling rapid transfer and input of data electronically, in addition to the continued and more laborious manual entry of analogue legacy data.

Ongoing and planned tasks include meeting all internal IT requirements to retain full corporate status, re-coding of old project datasets to enable compatibility with and hence input to the current database, developing input procedures for in-house laboratory-acquired geotechnical data and data values published in key reference works, improving procedures for the automated

loading of all BGS-held AGS data files and creating a user-friendly data retrieval system via a GIS interface and/or via the BGS intranet as part of the Intranet Data Access (IDA) system. It is also hoped that, in addition the current largely project-based data entry procedures, the entry of geotechnical datasets can be increased by instigating a systematic data-input strategy to enhance regional data coverage.

The database, at the time of preparing this report (September 2012), contained some 447,701 geotechnical sample records related to 95,937 boreholes and pits extracted from 4804 site investigation reports.

References

Most of the references listed below are held in the Library of the British Geological Survey at Keyworth, Nottingham. Copies of the references may be purchased from the Library subject to the current copyright legislation.

AGS. 1999. *Electronic tranfser of Geotechnical and Geoenvironmental Data*. Association of Geotechnical and Geoenvironmental Specialists, Beckingham, Kent, UK.

BSI. 1990. Methods *of Testing Soils for civil engineering purpose, BS1377*. British Standards Institution. London. UK

ISRM. 1978. Suggested methods for the qualitative description of discontinuities in rock masses. (International Society for Rock Mechanics, Commission on Standardisation of Laboratory and Field Tests*). International Journal Rock Mechanics Mining Sciencs Geomechanics Abstracts*, 15, 319-368.

ROE , P G AND WEBSTER, D C. 1984. *Specification for the TRRL frost-heave test. Supplementary Report SR829*. Transport and Road Research Laboratory, Crowthorne.

Appendix 1 Geotechnical Database Tables

BGS.GTCH_AGGREGATE (Rock testing – Aggregate results)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SPEC_REF	Varchar(20)	Specimen reference number	Default = 0
SPEC_DPTH	Number(10,3)	Specimen depth (m)	Default = 0
ROCK_PDEN	Number	Aggregate particle density (Mg/m^3)	CK1:Check constraint between 0 and 5
ROCK_DREM	Varchar(255)	Aggregate particle density test method and notes	
ROCK_WTAB	Number	Aggregate water absorption (%)	CK2:Check constraint between 0 and 50
ROCK_WREM	Varchar(255)	Aggregate water absorption test method and notes	
ROCK_SOUN	Number	Aggregate Soundness Test (%)	CK3:Check constraint between 0 and 99
ROCK_MREM	Varchar(255)	Aggregate Soundness test method and notes	
ROCK_ACV	Number	Aggregate Crushing Value (%)	CK4:Check constraint between 0 and 99
ROCK_CREM	Varchar(255)	Aggregate Crushing Value test method and notes	
ROCK_AIV	Number	Aggregate Impact Value (%)	CK5:Check constraint between 0 and 99
ROCK_IREM	Varchar(255)	Aggregate Impact Value test method and notes	
ROCK_LOSA	Number	Aggregate Los Angeles abrasion (%)	CK6:Check constraint between 0 and 99
ROCK_LREM	Varchar(255)	Aggregate Los Angeles abrasion test method and notes	
ROCK_AAV	Number	Aggregate Abrasion Value	CK7:Check constraint between 0 and 99
ROCK_PSV	Number	Aggregate Polished Stone Value	CK8:Check constraint between 0 and 99
ROCK_FI	Number	Aggregate Flakiness Index (%)	CK9:Check constraint between 0 and 99
ROCK_EI	Number	Aggregate Elongation Index (%)	CK10:Check constraint between 0 and 99
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;SPEC_REF:SPEC_DPTH

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_BRAZ (Rock testing – Brazilian tensile strength results)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SPEC_REF	Varchar(20)	Specimen reference number	Default = 0
SPEC_DPTH	Number(10,3)	Specimen depth (m)	Default = 0
ROCK_BRAZ	Number	Tensile strength by the Brazillian method (MPa or MN/m^2)	CK1:Check constraint between 0 and 999
ROCK_BREM	Varchar(255)	Notes on Brazillian tensile strength test including sample dimensions	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;SPEC_REF:SPEC_DPTH

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CBRG (California Bearing Ratio test – general)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CBRG_COND_ CODE	Varchar(6)	Sample condition (code)	FK2:Foreign Key to BGS.DIC_GTCH_CBRG_ COND
CBRG_METH_ CODE	Varchar(6)	Method of remoulding (code)	FK3:Foreign Key to BGS.DIC_GTCH_CBRG_ METH
CBRG_REM	Varchar(2000)	Notes on California Bearing Ratio (CBR) test	
CBRG_NMC	Number	Natural Moisture Content (%)	CK1:Check constraint between 0 and 999
CBRG_IMC	Number	Initial moisture content (%)	
CBRG_200	Number	Weight percent retained on 20mm sieve (%)	CK2:Check constraint between 0 and 100
CBRG_SWEL	Number	Amount of swell recorded (mm)	CK3:Check constraint between 0 and 10
CBRG_OMTP	Number	CBR at top – at optimum moisture content (%)	CK4:Check constraint between 0 and 200
CBRG_OMBT	Number	CBR at bottom – at optimum moisture content (%)	CK5:Check constraint between 0 and 200
CBR_OMC_MEAN	Number	CBR mean – at optimum moisture content (%)	CK6:Check constraint between 0 and 200
CBR_NMTP	Number	CBR at top – at natural moisture content (%)	CK7:Check constraint between 0 and 200
CBR_NMBT	Number	CBR at bottom – at natural moisture content (%)	CK8:Check constraint between 0 and 200
CBR_NMC_MEAN	Number	CBR mean – at natural moisture content (%)	CK9:Check constraint between 0 and 200
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CBRT (CBR test)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CBRT_TESN	Number(3)	CBR test number	
CBRT_TOP	Number	CBR at top (%)	CK1:Check constraint between 0 and 200
CBRT_BOT	Number	CBR at bottom (%)	CK2:Check constraint between 0 and 200
CBRT_MCT	Number	Moisture content at top (%)	CK3:Check constraint between 0 and 999
CBRT_MCBT	Number	Moisture content at bottom (%)	CK4:Check constraint between 0 and 999
CBRT_BDEN	Number	Bulk density (Mg/m^3)	CK5:Check constraint between 0 and 5
CBRT_DDEN	Number	Dry density (Mg/m^3)	CK6:Check constraint between 0 and 5
CBRT_SWEL	Number	Amount of swell recorded (mm)	
CBRT_REM	Varchar(2000)	Test specific remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;CBR_TESN

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CDIA (Casing diameter by depth)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
CDIA_CDEP	Number(10,3)	Depth achieved at CDIA_HOLE (m)	CK1:Check constraint between 0 and 1000
CDIA_HOLE	Number	Casing diameter (mm)	CK2:Check constraint between 0 and 999
CDIA_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;CDIA_CDEP;CDIA_HOLE

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_CHLK (Chalk tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CHLK_TESN	Number(3)	Chalk chrushing test number	
CHLK_CCV	Number	Chalk crushing value as BS 1377 Part 4 CI 6	
CHLK_MC	Number	Chalk natural moisture content (%)	CK1:Check constraint between 0 and 999
CHLK_SMC	Number	Chalk saturated moisture content (%)	CK2:Check constraint between 0 and 999
CHLK_010	Number	Weight percent retained on 10mm sieve (%)	CK3:Check constraint between 0 and 100
CHLK_REM	Varchar(2000)	Remarks	
CHLK_CARB	Number	Chalk calcium carbonate content (%)	CK4:Check constraint between 0 and 100
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;CHLK_TESN

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CHLK_ENG (Additional stratum descriptions for chalk)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	**GTCH_HOLE_ID**
GEOL_TOP	Number(10,3)	Depth to top of stratum (m)	CK1:Check constraint between 0 and 1000
GEOL_BASE	Number(10,3)	Depth to base of description (m)	CK2:Check constraint between 0 and 1000
CHLK_DEN_CODE	Varchar(25)	Chalk Density (code)	FK2:Foreign Key to BGS.DIC_GTCH_CHLK_DEN
CHLK_GRAD_CODE	Varchar(25)	Chalk Grade (code)	FK3:Foreign Key to BGS.DIC_GTCH_CHLK_GRAD
CHLK_FLINTS_CODE	Varchar(25)	Chalk flint content (code)	FK4:Foreign Key to BGS.DIC_GTCH_CHLK_FLINTS
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;GEOL_TOP;GEOL_BASE

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_CLSS (Classification tests)

GTCH_SAMP_ ID	Number(15)	Unique sample Identifier	
CLSS_NMC	Number	Natural moisture content (%)	CK1:Check constraint between 0 and 999
CLSS_LL	Number	Liquid limit (%)	CK2:Check constraint between –1 and 999 (Non-plastic is input as –1)
CLSS_PL	Number	Plastic limit (%)	CK3:Check constraint between –1 and 999 (Non-plastic is input as –1)
CLSS_BDEN	Number	Bulk Density (Mg/m^3)	CK4:Check constraint between 0 and 5
CLSS_DDEN	Number	Dry Density (Mg/m^3)	CK5:Check constraint between 0 and 5
CLSS_PD	Number	Particle Density (Mg/m^3)	CK6:Check constraint between 0 and 5
CLSS_425	Number	Percentage passing 425μm sieve (%)	CK7:Check constraint between 0 and 100
CLSS_PREP	Varchar(255)	Method of preparation	
CLSS_REM	Varchar(2000)	Notes on classification testing	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CMPG (Compaction tests – general)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CMPG_TYPE_ CODE	Varchar(6)	Compaction test type (code)	FK2:Foreign Key to BGS.DIC_GTCH_CMPG_ TYPE
CMPG_MOLD	Varchar(50)	Compaction mould type	
CMPG_375	Number	Weight percent of material retained on 37.5mm sieve (%)	
CMPG_200	Number	Weight percent of material retained on 20mm sieve (%)	
CMPG_PDEN	Number	Particle density measured or assumed (-) (Mg/m^3)	
CMPG_MAXD	Number	Maximum dry density (Mg/m^3)	CK1:Check constraint between 0 and 5
CMPG_MCOP	Number	Optimum moisture content (%)	CK2:Check constraint between 0 and 999
CMPG_REM	Varchar(2000)	Notes on compaction test required under BS 1377: 1990	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CNMT (Contaminant and chemical testing)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CNMT_TYPE_ CODE	Varchar(100)	Determinand (code)	FK2:Foreign Key to BGS.DIC_GTCH_ CNMT_TYPE(CODE)
CNMT_TEST_ TYPE_CODE	Varchar(100)	Test type (code)	FK3:Foreign Key to BGS.DIC_GTCH_ CNMT_TEST_TYPE(CODE)
SPEC_REF	Varchar(10)	Specimen Reference Number	Default='-'
SPEC_DEPTH	Number(10,3)	Specimen depth (m)	
CNMT_RESL	Number	Test result	
CNMT_UNIT	Varchar(100)	Test result units	
CNMT_CAS	Varchar(100)	Chemical Abstract Service registry number (where appropriate)	
CNMT_METH	Varchar(100)	Test method	
CNMT_PREP	Varchar(100)	Sample preparation	
CNMT_REM	Varchar(2000)	Comments on test	
CNMT_LIM	Varchar(100)	Method detection limit	
CNMT_ULIM	Varchar(100)	Method upper detection limit	
CNMT_NAME	Varchar(100)	Client/laboratory preferred name of determinand	
CNMT_LAB	Varchar(100)	Name of testing laboratory/organisation	
CNMT_CRED	Varchar(100)	Accrediting body (When appropriate)	
CNMT_LBID	Varchar(100)	Laboratory Internal reference	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;CNMT_TYPE;CNMT_TEST_TYPE;SPEC_REF; SPEC_DEPTH

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CONG (Consolidation Test – General Test Results)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CONG_TYPE_CODE	Varchar(25)	Oedometer or Rowe (code)	FK2:Foreign Key to BGS. DIC_GTCH_ CONG_TYPE
CONG_COND_CODE	Varchar(25)	Sample condition (code)	FK3:Foreign Key to BGS.DIC_GTCH_CONG_COND
CONG_REM	Varchar(2000)	Test details including method statement	
CONG_INCM	Number	Coefficient of volume compressibility over CONG_INCD (m^2/MN)	
CONG_INCD	Varchar(100)	Defined stress range (kN/m^2)	
CONG_DIA	Number	Test specimen diameter (mm)	
CONG_HIGT	Number	Test specimen height (mm)	
CONG_MCI	Number	Initial moisture content (%)	CK1:Check Constraint between 0 and 999
CONG_MCF	Number	Final moisture content (%)	CK2:Check Constraint between 0 and 999
CONG_BDEN	Number	Initial bulk density (Mg/m^3)	CK3:Check Constraint between 0 and 5
CONG_DDEN	Number	Initial dry density (Mg/m^3)	CK4:Check Constraint between 0 and 5
CONG_PDEN	Number	Particle density (BS 1377) with – if assumed	CK5:Check Constraint between -5 and 5
CONG_SATR	Number	Initial degree of saturation (%)	
CONG_SPRS	Number	Swelling pressure (kN/m^2)	
CONG_SATH	Number	Height change of specimen on saturation as percentage of original height (%)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
CONG_IVR	Number	Initial Void Ratio	

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CONS (Consolidation test results (for each stage of test))

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CONS_INCN	Number(38)	Oedometer stress increment number	CK1: Between 0 and 20
CONS_INCF	Number	Stress at end of stress increment/decrement (kPa)	
CONS_INCE	Number	Voids ratio at the end of the stress increment/decrement.	CK2: Between 0 and 20
CONS_INMV	Number	Reported coefficient of volume compressibility over the stress increment (Mv)(m2/MN)	CK3: Between -1 and 20
CONS_INCV	Number	Reported coefficient of consolidation over the stress increment (Cv)(m2/year)	CK4: Between 0 and 500
CONS_INSC	Number	Coefficient of secondary compression over stress increment	
CONS_CVRT	Number	Coefficient of consolidation determined by the root time method (m2/year)	CK5: Between 0 and 500
CONS_CVLG	Number	Coefficient of consolidation determined by the log time method (m2/year)	CK6: Between 0 and 500
CVT_CODE	Varchar(6)	Reported Cv derivation (log/square root)(code)	FK2 Foreign key to BGS.DIC_GTCH_CVT
CONS_REM	Varchar(2000)	Remarks including method used to determine coefficients reported under CONS_INMV and selected CONS_INCV (from either of CONS_CVRT or CONS_CVLG)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
CONS_INCI	Number	Stress at start of stress increment/decrement (kN/m2)	
CONS_IVR	Number	Voids ratio at start of increment	

Primary Key GTCH_SAMP_ID;CONS_INCN

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_CORE (Rotary core information)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
CORE_TOP	Number(10,3)	Depth to top of core run (m)	CK1:Check constraint between 0 and 1000
CORE_BOT	Number(10,3)	Depth to bottom of core run (m)	CK2:Check constraint between 0 and 1000
CORE_PREC	Number	Percentage total core recovery (TCR) (%)	CK3:Check constraint between 0 and 1000
CORE_SREC	Number	Percentage of 'solid' core recovery (SCR) (%)	CK4:Check constraint between 0 and 1000
CORE_RQD	Number	Rock Quality Designation (%)	CK5:Check constraint between 0 and 1000
CORE_DIAM	Number	Core diameter (mm)	CK6:Check constraint between 0 and 999
CORE_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;CORE_TOP;CORE_BOT

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_DISC (Discontinuity data)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
DISC_TOP	Number(10,3)	Depth to top in hole, or distance to start on traverse, of discontinuity zone, or discontinuity (m)	CK1:Check constraint between 0 and 1000
DISC_BASE	Number(10,3)	Depth to base in hole, or distance to end on traverse, of discontinuity zone, or discontinuity (m)	CK2:Check constraint between 0 and 1000
FRAC_SET	Varchar(50)	Discontinuity set reference number	
DISC_NUMB	Varchar(10)	Discontinuity number	
DISC_TYPE_CODE	Varchar(25)	Type of discontinuity (code)	FK2:Foreign Key to BGS.DIC_GTCH_DISC_TYPE (CODE)
DISC_DIP	Number	Dip of discontinuity (degrees)	CK3:Check constraint between 0 and 360
DISC_DIR	Number	Dip direction of discontinuity (degrees)	CK4:Check constraint between 0 and 360
DISC_RGH	Varchar(10)	Small scale roughness (ISRM, 1978)	
DISC_PLAN	Varchar(10)	Intermediate scale planarity (ISRM, 1978)	
DISC_WAVE	Number	Large scale waviness, wavelength (ISRM 1978)(m)	CK5:Check constraint between 0 and 1000
DISC_AMP	Number	Large scale waviness, amplitude(ISRM, 1978) (m)	CK6:Check constraint between 0 and 100
DISC_JRC	Number	Joint Roughness Coefficient (JRC)	CK7:Check constraint between 0 and 20
DISC_APP	Varchar(255)	Surface appearance	
DISC_APT	Number	Discontinuity aperture measurement (mm)	CK8:Check constraint between 0 and 10,000
DISC_APOB	Varchar(255)	Discontinuity aperture observation	
DISC_INFM	Varchar(100)	Infilling material	
DISC_TERM_CODE	Varchar(100)	Discontinuity termination (lower, upper) (ISRM 1978)	FK3:Foreign Key to BGS.DIC_GTCH_DISC_TERM
DISC_PERS	Number	Persistence measurement (m)	CK9:Check constraint between 0 and 1000
DISC_STR	Number	Discontinuity wall strength (MPa)	CK10:Check constraint between 0 and 500
DISC_WETH	Varchar(100)	Discontinuity wall weathering	
DISC_SEEP	Varchar(100)	Seepage rating (ISRM 1978)	
DISC_FLOW	Number	Water flow estimate (l/min)	CK11:Check constraint between 0 and 100
DISC_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;DISC_TOP;DISC_BASE;FRAC_SET;DISC_NUMB

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_FRAC (Fracture spacing)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
FRAC_TOP	Number(10,3)	Depth to top of zone (m)	CK1:Check constraint between 0 and 1000
FRAC_BASE	Number(10,3)	Depth to base of zone (m)	CK2:Check constraint between 0 and 1000
FRAC_SET	Varchar(25)	Discontinuity set reference number	Default = 0
FRAC_FI	Number	Fracture Index over zone (fractures per metre)	CK3:Check constraint between -1 and 1000
FRAC_IMAX	Number	Maximum fracture spacing over zone (mm)	CK4:Check constraint between –1 and 6000 (Non-Intact (NI) entered as –1)
FRAC_IAVE	Number	Average fracture spacing over zone (mm)	CK5:Check constraint between –1 and 6000 (Non-Intact (NI) entered as –1)
FRAC_IMIN	Number	Minimum fracture spacing over zone (mm)	CK6:Check constraint between –1 and 6000 (Non-Intact (NI) entered as –1)
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;FRAC_TOP;FRAC_BASE;FRAC_SET

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_FRST (Frost susceptibility)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
FRST_COND	Varchar(100)	Sample condition	FK2:Foreign Key to BGS.DIC_GTCH_FRST_COND
FRST_REM	Varchar(2000)	Notes on frost susceptibility testing as per TRRL SR 829 (Roe and Webster, 1984).	
FRST_DDEN	Number	Dry density (Mg/m^3)	CK1:Check constraint between 0 and 5
FRST_MC	Number	Moisture content (%)	CK2:Check constraint between 0 and 999
FRST_HVE1	Number	Frost heave, first specimen (%)	CK3:Check constraint between 0 and 100
FRST_HVE2	Number	Frost heave, second specimen (%)	CK4:Check constraint between 0 and 100
FRST_HVE3	Number	Frost heave, third specimen (%)	CK5:Check constraint between 0 and 100
FRST_HVE	Number	Mean heave of 3 specimens (%)	CK6:Check constraint between 0 and 100
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_GEOL (Stratum descriptions)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
GEOL_TOP	Number(10, 3)	Depth to top of stratum (m)	CK1:Check constraint between 0 and 1000
GEOL_BASE	Number(10, 3)	Depth to base of description (m)	CK2:Check constraint between 0 and 1000
LITHOSTRAT_ CODE	Varchar(5)	Lithostratigraphy (code)	FK4: Foreign Key to BGS.DIC_GTCH_LITHOSTRAT
LITHOLOGY_ CODE	Varchar(6)	Lithology (code)	FK5: Foreign key to BGS.DIC_ROCK_ALL
FEATURES_ CODE	Varchar(25)	Features (code)	FK2: Foreign Key to BGS.DIC_GTCH_ FEATURES
DISCONTINUITIES _CODE	Varchar(25)	Discontinuities (code)	FK3: Foreign key to BGS.DIC_GTCH_ DISCONTINUITIES
COLOUR_CODE	Varchar(50)	Colour (code)	
CONSISTENCY_ CODE	Varchar(50)	Consistency of the rock i.e. Firm, Stiff etc (code)	
GEOL_DESC	Varchar (2000)	Full description of the stratum	
LITHOSTRAT_ UNCERTAINTY	Varchar (255)	Lithostratigraphic uncertainty	
INTERP_BY	Varchar(50)	Geology interpreted by	May be the original contractors classification (CONT) or the classifications may be revised by a BGS geologist
INTERP_DATE	Date	Date geology interpreted	To be filled in if the classification has been revised by a BGS geologist.
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
ENGINEERING_ BED_CODE	Varchar(25)	Engineering Bed	

Primary Key GTCH_HOLE_ID;GEOL_TOP;GEOL_BASE

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_GRAD (Particle size distribution analysis data)

GTCH_SAMP_ ID	Number(15)	Unique sample Identifier	
PP00_002	Number	Percentage passing 0.002 mm (%)	CK1:Check constraint between 0 and 100
PP00_006	Number	Percentage passing 0.006 mm (%)	CK2:Check constraint between 0 and 100
PP00_020	Number	Percentage passing 0.020 mm (%)	CK3:Check constraint between 0 and 100
PP00_063	Number	Percentage passing 0.063 mm (%)	CK4:Check constraint between 0 and 100
PP00_150	Number	Percentage passing 0.150 mm (%)	CK5:Check constraint between 0 and 100
PP00_212	Number	Percentage passing 0.212 mm (%)	CK6:Check constraint between 0 and 100
PP00_300	Number	Percentage passing 0.300 mm (%)	CK7:Check constraint between 0 and 100
PP00_425	Number	Percentage passing 0.425 mm (%)	CK8:Check constraint between 0 and 100
PP00_600	Number	Percentage passing 0.600 mm (%)	CK9:Check constraint between 0 and 100
PP01_18	Number	Percentage passing 1.18 mm (%)	CK10:Check constraint between 0 and 100
PP02_00	Number	Percentage passing 2 mm (%)	CK11:Check constraint between 0 and 100
PP03_35	Number	Percentage passing 3.35 mm (%)	CK12:Check constraint between 0 and 100
PP05_00	Number	Percentage passing 5 mm (%)	CK13:Check constraint between 0 and 100
PP06_30	Number	Percentage passing 6.3 mm (%)	CK14:Check constraint between 0 and 100
PP10_00	Number	Percentage passing 10 mm (%)	CK15:Check constraint between 0 and 100
PP14_00	Number	Percentage passing 14 mm (%)	CK16:Check constraint between 0 and 100
PP20_00	Number	Percentage passing 20 mm (%)	CK17:Check constraint between 0 and 100
PP28_00	Number	Percentage passing 28 mm (%)	CK18:Check constraint between 0 and 100
PP37_50	Number	Percentage passing 37.5 mm (%)	CK19:Check constraint between 0 and 100
PP50_00	Number	Percentage passing 50mm (%)	CK20:Check constraint between 0 and 100
PP63_00	Number	Percentage passing 63mm (%)	CK21:Check constraint between 0 and 100
PP75_00	Number	Percentage passing 75mm (%)	CK22:Check constraint between 0 and 100
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_HOLE (Hole information)

GTCH_PROJ_ID	Number(15)	Unique Project Identifier	
GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	Automatically generated by the trigger GTCH_1_HOLE_TG1 from the sequence GTCH_1_HOLE_S1
BGS_ID	Number(38)	BGS Borehole ID	FK4: Foreign Key to BGS.SOBI
HOLE_ID	Varchar(25)	Ground Investigation hole number	
HOLE_LOCM_CODE	Varchar(25)	Method of location (code)	FK3: Foreign key to BGS. DIC_GTCH_HOLE_LOCM
TYCH_CHANGE_ DEPTH	Number(10,3)	Depth of drilling method change (m)	CK7:Check constraint between 0 and 1000
X	Number(10,3)	BNG – Easting coordinate (m)	CK1:Check Constraint between 0-700,000 (Use contractors coordinates where available)
Y	Number(10,3)	BNG – Northing coordinate (m)	CK2:Check Constraint between 0-1,500,000 (Use contractors coordinates where available)
ESPG_CODE	Varchar(20)	The international Association of Oil and Gas Producers (OGP) code for coordinate reference system	27700
XA	Number	The estimated accuracy of the X value – if the easting is quoted as 302630 and known to within 5 metres the XA is 5	
YA	Number	The estimated accuracy of the Y value – if the northing is quoted as 686570 and known to within 10 metres the YA is 10	
HOLE_GL	Number(10,3)	Ground level (ODN) (m)	CK3:Check constraint between –50 and 400
HOLE_FDEP	Number(10,3)	Final depth of hole (m)	CK4:Check constraint between 0 and 1000
HOLE_REM	Varchar(2000)	Remarks	
HOLE_ORNT	Number	Orientation of hole or traverse (degrees from north)(degrees)	CK5:Check constraint between 0 and 360
HOLE_INCL	Number	Inclination of hole or traverse (measured positively down from horizontal)(degrees)	CK6:Check constraint between 0 and 360
HOLE_STAB	Varchar(2000)	Stability	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
DRILLING_ METHOD_CODE	Varchar(25)	Drilling method (code)	FK2: Foreign key to BGS.DIC_GTCH_DRILLING_METHOD

Primary Key GTCH_HOLE_ID

Foreign Key GTCH_PROJ_ID to BGS.GTCH_PROJ

Unique Key GTCH_PROJ_ID;HOLE_ID

BGS.GTCH_ICBR (In situ California Bearing Ration test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
ICBR_DPTH	Number(10,3)	Depth to top of CBR test (m)	CK1:Check constraint between 0 and 1000
ICBR_TESN	Number(3)	Test Number	Default=0
ICBR_REM	Varchar(2000)	Details of apparatus and surcharge	
ICBR_ICBR	Number	California Bearing Ratio (CBR) value (%)	CK2:Check constraint between 0 and 999
ICBR_MC	Number	Moisture content relating to test (%)	CK3:Check constraint between 0 and 999
ICBR_DATE	Date	Test Date (dd/mm/yyyy)	
ICBR_SEAT	Number	Seating force (N)	
ICBR_SURC	Number	Surcharge Pressure (kN/m^2)	
ICBR_TYPE	Varchar(25)	Type of CBR	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;ICBR_DPTH;ICBR_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IDEN (In Situ density test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IDEN_DPTH	Number(10,3)	Depth of insitu density test (m)	CK1:Check constraint between 0 and 1000
IDEN_TESN	Number(3)	Test Number	Default=0
IDEN_DATE	Date	Test Date (dd/mm/yyyy)	
IDEN_REM	Varchar(2000)	Details of insitu density test	
IDEN_IDEN	Number	In situ bulk density (Mg/m^3)	CK2:Check constraint between 0 and 5
IDEN_MC	Number	Moisture content relating to insitu test (%)	CK3:Check constraint between 0 and 999
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IDEN_DPTH;IDEN_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IPRM (In situ permeability test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IPRM_TOP	Number(10,3)	Depth to top of test zone (m)	CK1:Check constraint between 0 and 1000
IPRM_BASE	Number(10,3)	Depth to base of test zone (m)	CK2:Check constraint between 0 and 1000
IPRM_STG	Number(3)	Stage Number of multistage packer test	Default=0
IPRM_TESN	Number(3)	Test Number	Default=0
IPRM_TYPE_ CODE	Varchar(6)	Type of test (code)	FK2:Foreign Key to BGS.DIC_GTCH_IPRM_TYPE
IPRM_PRWL	Number(10,3)	Depth to water in borehole or piezometer immediately prior to test (m)	CK3:Check constraint between 0 and 1000
IPRM_SWAL	Number(10,3)	Depth to water at start of test (m)	
IPRM_TDIA	Number	Diameter of test zone (m)	
IPRM_SDIA	Number	Diameter of standpipe or casing (m)	
IPRM_IPRM	Number	Permeability (m/s)	CK4:Check constraint between 1E-12 and 1
IPRM_REM	Varchar(2000)	Remarks	
IPRM_FLOW	Number	Average flow during packer test stage (l/s)	
IPRM_AWL	Number(10,3)	Depth to assumed standing water level (m)	
IPRM_HEAD	Number(10,3)	Applied total head of water during test stage at centre of packer test zone (m)	
IPRM_DATE	Date	Test date	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IPRM_TOP;IPRM_BASE;IPRM_STG;IPRM_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IRDX (In situ redox test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IRDX_DPTH	Number(10,3)	Depth of redox test (m)	CK1:Check constraint between 0 and 1000
IRDX_TESN	Number(3)	Test number	Default=0
IRDX_DATE	Date	Test date (dd/mm/yyyy)	
IRDX_REM	Varchar(2000)	Details of redox test and probe type	
IRDX_PH	Number	pH	CK2:Check constraint between 1 and 13
IRDX_IRDX	Number	Redox potential (mV)	CK3:Check constraint between -999 and 999
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IRDX_DPTH;IRDX_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IRES (In situ resistivity test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IRES_DPTH	Number(10,3)	Depth range to which in situ resistivity test relates	CK1:Check constraint between 0 and 1000
IRES_TESN	Number(3)	Test Number	Default=0
IRES_TYPE_CODE	Varchar(25)	Type of resistivity test (code)	FK2:Foreign Key to BGS.DIC_GTCH_ IRES_TYPE
IRES_DATE	Date	Test date (dd/mm/yyyy)	
IRES_IRES	Number	Result (ohm.cm)	CK2:Check constraint between 0 and 1,000,000
IRES_REM	Varchar(2000)	Details of test e.g. electrode spacing and configuration	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IRES_DPTH;IRES_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_ISPT (Standard Penetration Test results)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
ISPT_TOP	Number(10,3)	Depth before seating (m)	CK1:Check constraint between 0 and 1000
ISPT_SEAT	Number(3)	Number of blows for a seating drive (contractor)	CK2:Check constraint between 0 and 999
ISPT_MAIN	Number(3)	Number of blows for a test drive (contractor)	CK3:Check constraint between 0 and 999
ISPT_NPEN	Number(3)	Total penetration (mm)	CK4:Check constraint between 0 and 450
ISPT_NVAL	Number(3)	Contractors 'N' Value	CK5:Check constraint between 0 and 999
ISPT_REP	Varchar(255)	Standard Penetration Test (SPT) reported value	
ISPT_CAS	Number(10,3)	Casing depth at time of test (m)	CK6:Check constraint between 0 and 1000
ISPT_WAT	Number(10,3)	Depth to water at time of test (m)	CK7:Check constraint between 0 and 1000
ISPT_TYPE_ CODE	Varchar(6)	Type of SPT test (code)	FK2:Foreign key to BGS.DIC_GTCH_ISPT_TYPE (CODE)
ISPT_SWP	Number(3)	Self-weight penetration (mm)	
ISPT_REM	Varchar(2000)	Remarks relating to the test	
ISPT_INC1	Number(3)	Number of blows for 1st increment (Seating)	CK8:Check constraint between 0 and 999
ISPT_PEN1	Number(3)	Penetration for 1st increment (mm) (Seating)	CK9:Check constraint between 0 and 450
ISPT_INC2	Number(3)	Number of blows for 2nd increment (Seating)	CK10:Check constraint between 0 and 999
ISPT_PEN2	Number(3)	Penetration for 2nd increment (mm) (Seating)	CK11:Check constraint between 0 and 375
ISPT_INC3	Number(3)	Number of blows for 1st increment (Test)	CK12:Check constraint between 0 and 999
ISPT_PEN3	Number(3)	Penetration for 1st increment (mm) (Test)	CK13:Check constraint between 0 and 300
ISPT_INC4	Number(3)	Number of blows for 2nd increment (Test)	CK14:Check constraint between 0 and 999
ISPT_PEN4	Number(3)	Penetration for 2nd increment (mm) (Test)	CK15:Check constraint between 0 and 225
ISPT_INC5	Number(3)	Number of blows for 3rd increment (Test)	CK16:Check constraint between 0 and 999
ISPT_PEN5	Number(3)	Penetration for 3rd increment (mm) (Test)	CK17:Check constraint between 0 and 150
ISPT_INC6	Number(3)	Number of blows for 4th increment (Test)	CK18:Check constraint between 0 and 999
ISPT_PEN6	Number(3)	Penetration for 4th increment (mm) (Test)	CK19:Check constraint between 0 and 75
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;ISPT_TOP

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IUCS (In situ Uniaxial Compressive Strength test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IUCS_DPTH	Number(10,3)	Depth of UCS test (m)	CK1:Check constraint between 0 and 1000
IUCS_TESN	Number(3)	Test number	Default=0
IUCS_IUCS	Number	Unconfined compression strength by hand penetrometer (kN/m^2)	CK2:Check constraint between 0 and 10,000
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IUCS_DPTH;IUCS_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_IVAN (In situ vane test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
IVAN_DPTH	Number(10,3)	Depth of vane test (m)	CK1:Check constraint between 0 and 1000
IVAN_TESN	Number(3)	Test number	Default=0
IVAN_REM	Varchar(2000)	Details of vane test, vane size, vane type	
IVAN_IVAN	Number	Vane test result (kN/m^2)	CK2:Check constraint between 0 and 10,000
IVAN_IVAR	Number	Vane test remoulded result (kN/m^2)	CK3:Check constraint between 0 and 10,000
IVAN_IPEN	Number	Hand penetrometer result (kN/m^2)	
IVAN_DATE	Date	Test date (dd/mm/yyyy)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;IVAN_DPTH;IVAN_TESN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_MCVT (Moisture Condition Value test)

GTCH_SAMP_ ID	Number(15)	Unique sample Identifier	
MCV_RELK	Number	MCV value at MCVT_MC moisture content.	(For the geotechnical database data is only entered where MCVT_MC equals natural moisture content) CK1:Check constraint between 0 and 100
MCVT_BDEN	Number	Bulk density related to the MCV_RELK MCV (Mg/m3)	CK2:Check constraint between 0 and 5
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_MODULUS (Rock testing – Modulus related test results)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
ROCK_E	Number	Elastic (Youngs) modulus (MPa or MN/m^2)	
ROCK_MU	Number	Poisson's ratio	CK1:Check constraint between 0 and 5
ROCK_EMOD	Number	Dynamic Elastic Modulus (GPa)	CK2:Check constraint between 0 and 150
ROCK_SG	Number	Shear modulus derived from ROCK_SWAV (GPa)	CK3:Check constraint between 0 and 100
ROCK_SWEL	Number	Rock swelling index (kN/m^2)	CK4:Check constraint between 0 and 2
MODULUS_REM	Varchar(255)	Modulus related remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_POBS (Piezometer readings)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PREF_TDEP	Number (10,3)	Depth to reference level to piezometer tip (m)	CK1:Check constraint between 0 and 1000
POBS_DATE	Date	Date of piezometer reading (dd/mm/yyyy)	
POBS_TIME	Varchar(8)	Time of piezometer reading (hh:mm:ss)	
POBS_DEP	Number(10,3)	Depth to water below ground surface (m)	CK2:Check constraint between -5 and 1000
POBS_HEAD	Number (10,3)	Head of water above piezometer tip (m)	CK3:Check constraint between 0 and 1000
POBS_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PREF_TDEP;POBS_DATE;POBS_TIME

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_PREF (Piezometer installation details)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PREF_TDEP	Number (10,3)	Depth to reference level of piezometer tip (m)	CK1:Check constraint between 0 and 1000
PREF_DATE	Date	Piezometer installation date (dd/mm/yyyy)	
PREF_TYPE	Varchar(50)	Piezometer type	
PREF_TRPS	Number(10,3)	Depth to top of response zone (m)	CK2:Check constraint between 0 and 1000
PREF_BRPS	Number(10,3)	Depth to base of response zone (m)	CK3:Check constraint between 0 and 1000
PREF_REM	Varchar(2000)	Details of type and depths of grouting and readout arrangements/locations	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PREF_TDEP

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_PROJ (Project details)

GTCH_PROJ_ ID	Number(15)	Unique Project Identifier	Automatically generated by the trigger GTCH_PROJ_TG1 from the sequence GTCH_PROJ_S1
CONTRACTOR_ NAME	Varchar(225)	Contractors name	
PROJ_ID	Varchar(20)	Contractors report number	
ACCESSUSE_ CODE	Varchar(5)	Access use (code)	FK1: Foreign key to BGS.DIC_MET_ACCESSUSE_RESTRIC
PROJ_NAME	Varchar(255)	Ground Investigation title	General Scheme e.g. M6 Widening J11-14
PROJ_CLNT	Varchar(255)	Client	
PROJ_ENG	Varchar(255)	Engineer	
PROJ_MEMO	Varchar(2000)	Comments	
PROJ_DATE	Date	Date of Report (dd/mm/yyyy)	
SI_ID	Number(8)	Site Investigation Report ID to link to table BGS.BGS_SI	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
CONFIDENTIALITY _CODE	Varchar(5)	Confidentiality (code)	FK2: Foreign key to BGS.DIC_MET_CONFIDENTIALITY
STANDARD	Varchar(100)	Standard to which the report conforms	

Primary Key GTCH_PROJ_ID

Unique Key CONTRACTOR_NAME;PROJ_ID

BGS.GTCH_PROJ_DATA_ENTRY (Data entry details)

GTCH_PROJ_ID	Number(15)	Unique Project Identifier	
ENTRY_ NUMBER	Number (2)		
PROJECT_NAME	Varchar(255)	Project Name	
DATA_ENTERED	Varchar(255)	Amount of source data entered	e.g. Lias Group only Trial Pits not entered
FORMAT	Varchar(25)	Format of source data	M=Manual AGS=AGS
COMMENTS	Varchar(255)	COMMENTS	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger. FK3:Foreign key to BGS.DIC_GTCH_USER_ENTERED (CODE)
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_PROJ_ID;ENTRY_NUMBER

Foreign Key GTCH_PROJ_ID to BGS.GTCH_PROJ

BGS.GTCH_PRTD (Pressuremeter test data)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PRTD_TREF	Varchar(25)	Reference number of test	
PRTD_DPTH	Number(10,3)	Depth of test (m)	CK1:Check constraint between 0 and 1000
PRTD_SEQ	Varchar(25)	Sequence number	
PRTD_DATE	Date	Date of test (dd/mm/yyyy)	
PRTD_TYPE_CODE	Varchar(25)	Pressuremeter type (code)	FK2:Foreign Key to BGS.DIC_GTCH_PRTD_TYPE
PRTD_DIA	Number	Uninflated diameter of pressuremeter (mm)	CK2:Check constraint between 0 and 90
PRTD_ARM1	Number	Arm (pair) 1 displacement (mm)	
PRTD_ARM2	Number	Arm (pair) 2 displacement (mm)	
PRTD_ARM3	Number	Arm (pair) 3 displacement (mm)	
PRTD_TPC1	Number	Total pressure/arm (pair) 1 (kN/m^2)	
PRTD_TPC2	Number	Total pressure/arm (pair) 2 (kN/m^2)	
PRTD_TPC3	Number	Total pressure/arm (pair) 3 (kN/m^2)	
PRTD_PPA	Number	Pore pressure cell A (kN/m^2)	
PRTD_PPB	Number	Pore pressure cell B (kN/m^2)	
PRTD_REM	Varchar(2000)	Remarks	
PRTD_PRES	Number	Total pressure in test cell (kN/m^2)	
PRTD_VOL	Number	Volume change in test cell (cm^3)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PRTD_TREF;PRTD_DPTH;PRTD_SEQ

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_PRTG (Pressuremeter test results, general)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PRTD_TREF	Varchar(25)	Reference number of test	
PRTD_DPTH	Number(10,3)	Depth of test (m)	CK1:Check constraint between 0 and 1000
PRTD_DATE	Date	Date of test (dd/mm/yyyy)	
PRTD_TYPE_CODE	Varchar(25)	Pressuremeter type (code)	FK2:Foreign Key to BGS.DIC_GTCH_ PRTD_TYPE
PRTD_DIA	Number	Uninflated diameter of pressuremeter (mm)	CK2:Check constraint between 0 and 90
PRTG_HA1	Number	Estimated horizontal stress, arm (pair) 1 (kN/m^2)	
PRTG_HA2	Number	Estimated horizontal stress, arm (pair) 2 (kN/m^2)	
PRTG_HA3	Number	Estimated horizontal stress, arm (pair) 3 (kN/m^2)	
PRTG_HAA	Number	Estimated horizontal stress, average (kN/m^2)	
PRTG_GIA1	Number	Initial shear modulus, arm (pair) 1 (MN/m^2)	
PRTG_GIA2	Number	Initial shear modulus, arm (pair) 2 (MN/m^2)	
PRTG_GIA3	Number	Initial shear modulus, arm (pair) 3 (MN/m^2)	
PRTG_GIAA	Number	Initial shear modulus, average (MN/m^2)	
PRTG_CUA1	Number	Undrained shear strength, arm (pair) 1 (MN/m^2)	
PRTG_CUA2	Number	Undrained shear strength, arm (pair) 2 (MN/m^2)	
PRTG_CUA3	Number	Undrained shear strength, arm (pair) 3 (MN/m^2)	
PRTG_CUAA	Number	Undrained shear strength, average (MN/m^2)	
PRTG_PLA1	Number	Limit pressure, arm (pair) 1 (MN/m^2)	
PRTG_PLA2	Number	Limit pressure, arm (pair) 2 (MN/m^2)	
PRTG_PLA3	Number	Limit pressure, arm (pair) 3 (MN/m^2)	
PRTG_PLAA	Number	Limit pressure, average (MN/m^2)	
PRTG_AFA1	Number	Angle of friction, arm (pair) 1 (deg)	
PRTG_AFA2	Number	Angle of friction, arm (pair) 2 (deg)	
PRTG_AFA3	Number	Angle of friction, arm (pair) 3 (deg)	
PRTG_AFAA	Number	Angle of friction, average (deg)	
PRTG_ADA1	Number	Angle of dilation, arm (pair) 1 (deg)	
PRTG_ADA2	Number	Angle of dilation, arm (pair) 2 (deg)	
PRTG_ADA3	Number	Angle of dilation, arm (pair) 3 (deg)	
PRTG_ADAA	Number	Angle of dilation, average (deg)	
PRTG_AFCV	Number	Angle of friction at constant volume (cv) used (deg)	
PRTG_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PRTD_TREF;PRTD_DPTH;

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_PTRL (Pressuremeter test results, individual loops)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PRTD_TREF	Varchar(25)	Reference number of test	
PRTD_DPTH	Number(10,3)	Depth of test (m)	CK1:Check constraint between 0 and 1000
PRTl_LNO	Varchar(25)	Unload/Reload loop number	
PRTD_DATE	Date	Date of test (dd/mm/yyyy)	
PRTD_TYPE_ CODE	Varchar(25)	Pressuremeter type (code)	FK2:Foreign Key to BGS.DIC_GTCH_ PRTD_TYPE
PRTD_DIA	Number	Uninflated diameter of pressuremeter (mm)	CK2:Check constraint between 0 and 90
PRTL_GA1	Number	Unload/Reload shear modulus, arm (pair) 1 (MN/m^2)	
PRTL_GA2	Number	Unload/Reload shear modulus, arm (pair) 2 (MN/m^2)	
PRTL_GA3	Number	Unload/Reload shear modulus, arm (pair) 3 (MN/m^2)	
PRTL_GAA	Number	Unload/Reload shear modulus, average (MN/m^2)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PRTD_TREF;PRTD_DPTH;PRTL_LNO

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_PTLD (Point load tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SPEC_REF	Varchar(20)	Specimen reference number	Default = 0
SPEC_DPTH	Number(10,3)	Specimen depth(m)	Default = 0
ROCK_PLTF_ CODE	Varchar(10)	Point load test type (Code)	FK2:Foreign key to BGS.DIC_GTCH_PLTF(CODE)
ROCK_PLS	Number	Uncorrected point load (Is) (MN/m^2)	CK1:Check constraint between 0 and 200
ROCK_PLSI	Number	Size corrected point load index (Is_{50}) (MN/m^2)	CK2:Check constraint between 0 and 200
ROCK_PREM	Varchar(2000)	Details additional to ROCK_PLTF	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;SPEC_REF;SPEC_DPTH;ROCK_PLTF_CODE

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_PTST (Laboratory permeability tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
PTST_TESN	Varchar(5)	Permeability test number	
PTST_REM	Varchar(2000)	Permeability test method	
PTST_COND_ CODE	Varchar(25)	Sample condition	FK2:Foreign Key to BGS.DIC_GTCH_PTST_COND
PTST_SZUN	Number	Size cut off material too coarse for testing (mm)	CK1:Check constraint between 0 and 999
PTST_UNS	Number	Proportion of material too coarse for testing – BS 1377:1990 Part 5 cl 5.7. (%)	CK2:Check constraint between 0 and 100
PTST_DIA	Number	Diameter of test sample (mm)	CK3:Check constraint between 0 and 999
PTST_LEN	Number	Length of test sample (mm)	CK4:Check constraint between 0 and 999
PTST_MC	Number	Initial moisture content of test sample (%)	CK5:Check constraint between 0 and 999
PTST_BDEN	Number	Initial bulk density of test sample (Mg/m^3)	CK6:Check constraint between 0 and 5
PTST_DDEN	Number	Dry density of test sample (Mg/m^3)	CK7:Check constraint between 0 and 5
PTST_VOID	Number	Voids ratio of test sample	CK8:Check constraint between 0 and 999
PTST_K	Number	Coefficient of permeability (m/s)	CK9:Check constraint between 1E-12 and 1
PTST_TSTR	Number	Mean effective stress at which permeability measured (when measured in triaxial cell) (kN/m^2)	
PTST_ISAT	Number	Initial degree of saturation(%)	CK10:Check constraint between 0 and 999
PTST_FSAT	Number	Final degree of saturation (%)	CK11:Check constraint between 0 and 999
PTST_PDEN	Number	Particle density, measured or (-) assumed	CK12Check constraint between –5 and 5
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;PTST_TESN

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_PUMP (Pumping test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
PUMP_DATE	Date	Date of reading (dd/mm/yyyy)	
PUMP_TIME	Date	Time of reading (hh:mm:ss)	
PUMP_DPTH	Number (10,3)	Depth to water below ground (m)	CK1:Check constraint between 0 and 1000
PUMP_QUAT	Number	Pumping rate from hole (l/s)	CK2:Check constraint between 0 and 200
PUMP_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;PUMP_DATE;PUMP_TIME

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_RELD (Relative density test)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
RELD_REM	Varchar (2000)	Method of test	
RELD_DMAX	Number	Maximum dry density as BS 1377 part 4 cl 4. (Mg/m^3)	CK1:Check constraint between 0 and 5
RELD_375	Number	Weight percent of sample retained on 37.5mm sieve (%)	CK2:Check constraint between 0 and 100
RELD_063	Number	Weight percent of sample retained on 6.3mm sieve (%)	CK3:Check constraint between 0 and 100
RELD_020	Number	Weight percent of sample retained on 2mm sieve (%)	CK4:Check constraint between 0 and 100
RELD_DMIN	Number	Minimum dry density as BS 1377 part 4 cl 4 (Mg/m^3)	Ck5:Check constraint between 0 and 5
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_ROCK (Rock testing)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SPEC_REF	Varchar(20)	Specimen reference number	Default = 0
SPEC_DPTH	Number(10,3)	Specimen depth (m)	Default = 0
ROCK_REM	Varchar(255)	Remarks	
ROCK_PORO	Number	Rock porosity (%)	CK1:Check constraint between 0 and 999
ROCK_PORE	Varchar(255)	Notes on type of porosity test	
ROCK_MC	Number	Natural moisture content (%)	CK2:Check constraint between 0 and 999
ROCK_BDEN	Number	Rock bulk density (Mg/m^3)	CK3:Check constraint between 0 and 5
ROCK_DDEN	Number	Rock dry density (Mg/m^3)	CK4:Check constraint between 0 and 5
ROCK_UCS	Number	Uniaxial compressive strength (size corrected) (MPa or MN/m^2)	CK5:Check constraint between 0 and 500
ROCK_UREM	Varchar(255)	Notes on uniaxial compressive strength test, including sample dimensions	
ROCK_DESC	Varchar(255)	Specimen description	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID;SPEC_REF:SPEC_DPTH

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_RWL (Rest water level data)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
RWL_ID	Number(1)	Sequential unique identifier	
RWL_DATE	Date	Date of resting water level measurement (dd/mm/yyyy)	
RWL_DATE_ ACCURACY_CODE	Char(1)	Date accuracy code	FK2:Foreign Key to BGS.DIC_GTCH_DATE_ ACCURACY
RWL_MBGL	Number(10,3)	Rest water below ground (m).	
RWL_MAOD	Number(10,3)	Rest water below OD (m).	
ARTESIAN	Char(1)	Artesian (Yes/No)	
DRY	Char(1)	Dry (Yes/No)	
RWL_ACCURACY_ CODE	Char(1)	Accuracy of level in metres if known.	FK3:Foreign Key to BGS.DIC_GTCH_ RWL_ACCURACY
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;RWL_ID

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_SAMP (Sample reference information)

GTCH_HOLE_ID	Number(15) Not Null	Unique Hole Identifier	
GTCH_SAMP_ID	Number(15)	Unique sample Identifier	Automatically generated by the trigger GTCH_SAMP_TG1 from the sequence GTCH_SAMP_S1
SAMP_TOP	Number(10,3) Not Null	Depth to top of sample (m)	CK1:Check constraint between 0 and 1000
SAMP_REF	Varchar(20)	Sample reference number	
SAMP_TYPE_ CODE	Varchar(10)	Sample type (code)	FK2:Foreign key to BGS. DIC_GTCH_SAMPLE_TYPE (CODE)
SAMP_DIA	Number	Sample diameter (mm)	CK2:Check constraint between 20 and 300
SAMP_BASE	Number(10,3) Not Null	Depth to base of sample (m)	CK3:Check constraint between 0 and 1000
SAMP_DESC	Varchar(2000)	Sample description	
SAMP_UBLO	Number(5)	Number of blows required to drive sampler	CK4:Check constraint between 0 and 999
SAMP_REM	Varchar(2000)	Sample remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

Unique Key GTCH_HOLE_ID;SAMP_TOP; SAMP_BASE;SAMP_TYPE;SAMP_REF

BGS.GTCH_SDI (Rock testing – Slake Durability Index)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
ROCK_SDI	Number	Slake Durability Index (%)	CK1:Check constraint between 0 and 100
ROCK_SREM	Varchar(255)	Slake durability test method and notes	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_SHBG (Shear box testing – general)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SHBG_TYPE_ CODE	Varchar(10)	Test type e.g. small shear box, large shear box, ring shear (code)	FK2:Foreign Key to BGS.DIC_GTCH_ SHBG_TYPE
SHBG_REM	Varchar(2000)	Test notes e.g. undisturbed, pre-existing shear, recompacted, rock joint, cut plane	
SHBG_PCOH	Number	Peak cohesion intercept (kN/m^2)	CK1:Check constraint between 0 and 999
SHBG_PHI	Number	Peak angle of friction (degrees)	CK2:Check constraint between 0 and 90
SHBG_RCOH	Number	Residual cohesion intercept (kN/m^2)	CK3:Check constraint between 0 and 999
SHBG_RPHI	Number	Residual angle of friction (degrees)	CK4:Check constraint between 0 and 90
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_SHORE (Rock testing – Shore hardness)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
ROCK_SHOR	Number	Shore hardness	CK1:Check constraint between 0 and 100
SHOR_REM	Varchar(255)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_SHRINKAGE (Shrinkage tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CLSS_SLIM	Number	Shrinkage limit (%)	CK1:Check constraint between 0 and 100
CLSS_LS	Number	Linear shrinkage (%)	CK2:Check constraint between 0 and 100
SHRINKAGE_REM	Varchar(200)	Notes on shrinkage testing	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_STCN (Static cone penetration test)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
STCN_DPTH	Number (10,3)	Depth of result for static cone test (m)	CK1:Check constraint between 0 and 1000
STCN_TYPE_ CODE	Varchar(25)	Cone test type (code)	FK2:Foreign key to BGS. DIC_GTCH_STCN_TYPE (CODE)
STCN_REF	Varchar(20)	Cone identification reference	
STCN_FORC	Number	Axial force (Qc) (kN)	
STCN_FRIC	Number	Frictional force on sleeve (Qs) (kN)	
STCN_RES	Number	Cone resistance (MN/m^2)	
STCN_FRES	Number	Local unit side friction resistance (kN/m^2)	
STCN_PWP1	Number	Porewater pressure (kN/m^2)	
STCN_PWP2	Number	Second porewater pressure (kN/m^2)	
STCN_PWP3	Number	Third porewater pressure (kN/m^2)	
STCN_CON	Number	Conductivity (uS/cm)	
STCN_TEMP	Number	Temperature (DegC)	
STCN_PH	Number	pH reading	
STCN_SLP1	Number	Slope Indicator no. 1 (deg)	
STCN_SLP2	Number	Slope Indicator no. 2 (deg)	
STCN_REDX	Number	Redox potential reading (mV)	
STCN_FFD	Number	Fluorescence intensity (%)	
STCN_PMT	Number	Photo-multiplier tube reading (counts/s)	
STCN_PID	Number	Photo ionisation detector reading (uV)	
STCN_FID	Number	Flame ionisation detector reading (uV)	
STCN_CFR	Number	Photo ionization detector reading (uV)	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;STCN_DPTH

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_SUCT (Suction tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
SUCT_METH_ CODE	Varchar(100)	Test method (copde)	FK2:Foreign Key to BGS.DIC_GTCH_SUCT_ METH
SUCT_VAL	Number	Suction Value (kN/m^2)	CK1:Check constraint between 0 and 10,000
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_TRIG (Triaxial tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
TRIG_TYPE_ CODE	Varchar(10)	Test type (code)	FK3:Foreign Key to BGS.DIC_GTCH_ TRIG_TYPE
TRIG_COND_ CODE	Varchar(10)	Sample condition (code)	FK4:Foreign Key to BGS.DIC_GTCH_ TRIG_COND
TRIG_REM	Varchar(2000)	Test method, additional information, failure criteria	
TRIG_CU	Number	Value of undrained shear strength (kPa)	CK1:Check constraint between 0 and 9000
TRIG_COH	Number	Cohesion intercept associated with TRIG_PHI (kPa)	CK2:Check constraint between 0 and 9000
TRIG_PHI	Number	Angle of friction for effective shear strength triaxial test (Degrees)	CK3:Check constraint between 0 and 90
TRIX_SDIA	Number	Specimen diameter (mm)	
TRIX_MC	Number	Specimen initial moisture content (%)	
TRIX_MODE_ CODE	Varchar(10)	Mode of failure (code)	FK2:BGS.DIC_ GTCH_TRIX_MODE
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_VANE (Sample vane tests)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
CLSS_HVP	Number	Hand vane undrained shear strength (peak) (kN/m^2)	CK1:Check constraint between 0 and 300
CLSS_HVR	Number	Hand vane undrained shear strength (remoulded) (kN/m^2)	CK2:Check constraint between 0 and 300
CLSS_PPEN	Number	Pocket penetrometer undrained shear strength (kN/m^2)	CK3:Check constraint between 0 and 300
CLSS_VNPK	Number	Laboratory vane undrained shear strength (peak) (kN/m^2)	CK4:Check constraint between 0 and 300
CLSS_VNRM	Number	Laboratory vane undrained shear strength (remoulded) (kN/m^2)	CK5:Check constraint between 0 and 300
CLSS_REM	Varchar(2000)	Notes on vane testing	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_VELOCITY (Rock testing – P-wave and S-wave velocity measurements)

GTCH_SAMP_ID	Number(15)	Unique sample Identifier	
ROCK_PWAV	Number	P-wave velocity (m/s)	CK1:Check constraint between 0 and 8000
ROCK_SWAV	Number	S-wave velocity (m/s)	CK2:Check constraint between 0 and 4000
VELOCITY_REM	Varchar(255)	Velocity related remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_SAMP_ID

Foreign Key GTCH_SAMP_ID to BGS.GTCH_SAMP

BGS.GTCH_WETH (Weathering grades)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
WETH_TOP	Number(10,3)	Depth to top of weathering subdivision (m)	CK1:Check constraint between 0 and 1000
WETH_BASE	Number(10,3)	Depth to base of weathering subdivision (m)	CK2:Check constraint between 0 and 1000
WETH_GRAD	Varchar(100)	Material weathering grade	
WETH_SCH	Varchar(100)	Weathering scheme	
WETH_REM	Varchar(2000)	Remarks	
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger

Primary Key GTCH_HOLE_ID;WETH_TOP;WETH_BASE

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

BGS.GTCH_WSTK (Water strike details)

GTCH_HOLE_ID	Number(15)	Unique Hole Identifier	
WSTK_DEP	Number(10,3)	Depth to water strike (m)	CK1:Check constraint between 0 and 1000
WSTK_NMIN	Number	Minutes after strike (min)	Null value entered as -1
WSTK_CAS	Number(10,3)	Casing depth at time of water strike (m)	CK2:Check constraint between 0 and 1000
WSTK_DATE	Date	Date of water strike (dd/mm/yyyy)	
WSTK_TIME	Varchar(8)	Time of water strike (hh:mm)	
WSTK_POST	Number(10,3)	Depth to water after WSTK_NMIN minutes(m)	CK3:Check constraint between 0 and 1000
WSTK_FLOW	Varchar(2000)	Flow rate remarks	
WSTK_SEAL	Number(10,3)	Depth at which water strike sealed by casing (m)	CK4:Check constraint between 0 and 1000
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
ENTRY_NUMBER	Number(2)	Entry Number	

Primary Key GTCH_HOLE_ID;WSTK_DEP;WSTK_NMIN

Foreign Key GTCH_HOLE_ID to BGS.GTCH_HOLE

Dictionaries

Apart from where stated, all the dictionary tables are in the corporate standard format.

BGS.DIC_GTCH_Table Name

CODE	Varchar	Code	
DESCRIPTION	Varchar(255)	Description	
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
STATUS	Varchar(1)	Status – Current or Obsolete (C or O)	Audit field entered automatically by trigger
TRANSLATION	Varchar(50)		Audit field entered automatically by trigger

Primary Key CODE

GTCH_DIC_GTCH_LITHOSTRAT (Lithostratigraphy)

CODE	Varchar(25)	Code	FK1: Foreign key to BGS.LEX_ LITHOSTRAT_UNIT_ V3
LITHOSTRAT_ DESCRIPTION	Varchar(255)	Description	
CHRONOSTRAT_ FROM_CODE	Varchar(2)	Chronostrat code (base of lithostratographic unit) associated with CODE	
CHRONOSTRAT_ TO_CODE	Varchar(2)	Chronostrat code (top of lithostratographic unit) associated with CODE	
LITHOSTRAT_ GROUP	Varchar(25)	Lithostratigraphy group code associated with CODE	
LITHOSTRAT_ FORMATION	Varchar(25)	Lithostratigraphy formation code associated with CODE	
LITHOSTRAT_ MEMBER	Varchar(25)	Lithostratigraphy member code associated with CODE	
LITHOSTRAT_ BED	Varchar(25)	Lithostratigraphy bed code associated with CODE	
DATE_ENTERED	Date Not Null	Date data entered	Audit field entered automatically by trigger
USER_ENTERED	Varchar(10) Not Null	Oracle ID of user entering data	Audit field entered automatically by trigger
DATE_UPDATED	Date	Date data updated	Audit field entered automatically by trigger
USER_UPDATED	Varchar(10)	Oracle ID of user updating data	Audit field entered automatically by trigger
STATUS	Varchar(1)	Status – Current or Obsolete (C or O)	Audit field entered automatically by trigger
TRANSLATION	Varchar(50)		Audit field entered automatically by trigger

Primary Key CODE