Field Application

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Geotab is used for the entry and validation of boring data directly on the field, on Android tablets. The data are saved in Geotec databases DB of SQLite type (.db3). The .db3 databases can be read directly in one of the Geotec modules or exported to Geotec databases under Access (.mdb), SQL Server or Oracle via the DBM module.

Geotab is the ideal application to save transcription time, to avoid transcription errors and to do a preliminary validation to ensure that all boring data are complete before leaving the field.

1. Requirements for Geotab

- Android version 6.0 or more recent

- 7" to 10" tablet

- Optimized for a 'normal' font size or smaller

- Optimized for a 'small' display size for 7" screens

- Version 8.08 or more recent of Geotec is required on Windows to export data from the .db3 databases or to read them directly in the modules.

2. Installation of Geotab application

1. Download Geotab from our website or via Google Play (version 8.11.0 only). You may have to accept the installation from unknown sources.

2. Allow Geotab to access the tablet's location and storage.

3. Activate your licence (paragraph 2.1).

4. Create the Geotab folders and files (paragraph 2.2).

2.1. Shared licences

Geotab works with shared licences where the number of concurrent licences correspond to the number of shared licences purchased monthly or annually. When a licence is active, it is not available to other company users until it is deactivated.

The tablet must be added to the company account.

- Enter the **user code** provided by Sobek and made of "G" followed by 3 numbers. It is specific to the company.

- Enter the **admin password** provided by Sobek to add the tablet. It is specific to the company.

- Enter a **description** to add the tablet. It's an identification for your internal management.

- Enter your name as **current user**. The same name will be suggested next time you activate a licence on the same tablet but can be modified.

- Open the calendar to select the **deactivation date** for your licence – for an activation period between 1 and 31 days maximum. By default, the deactivation date is 7 days from the current date. It is also possible to manually deactivate the licence (paragraph 2.1.1).

- The **Android ID** is for reference only and is a unique identifier.

Select **Activate my licence.** You **must be connected to Internet** to activate the licence. If a licence is available in the current shared licences contract, the licence is activated and Geotab restarts.

Once the tablet is added, the licence is activated only with the **user code**, and the **current user** can be modified, if needed.

Figure 1 – Shared licences

2.1.1. Information about the licence

The Licence icon located in the home screen is used to display information about the licence. The information about the licence includes:

- Date until the licence has been activated and number of days remaining before its automatic deactivation

- Date until the licence is valid, in other words, the contract end date. After this date, the licence must be renewed with Sobek.

- The Android ID.

- The internal identification (description) of the tablet. It can only be modified by an administrator.

- The name of the current user. It can be modified at the next licence activation.

- The number of licences available (not activated) over the total number of licences for the company

From 7 days before the automatic deactivation date, the icon displays the number of days remaining. You can then use the **Reactivate my licence** button to extend the activation period.

At any time, use the **Deactivate my licence** button to return it and make it available for another user.

2.2. Creation of Geotab folders and files

When installing Geotab, you must create the folders and files required for the complete use of Geotab.

- The **Geotec** folder and its **data**, **style, export** and **import** subfolders will be created under /storage/emulated/0.

- The **French** and **English** checkboxes define the files that will be installed. By default, the tablet's language is checked. If both languages are selected, all files will be installed and those for the current language will be opened the first time.

- The **Presentation files (styles)** checkbox cannot be unchecked. The files are:

  o Two style files; one specific to boreholes, the other to trenches

  o The Geotec8.ptn patterns file

  o The Geotec8.mrk markers file

  These files are saved in the **style** folder. The borehole style and the other two files open automatically after installation.

- The **Database** checkbox cannot be unchecked. The file is:

  o The Geotec_en.db3 database (and / or Geotec_fr.db3 in French).

  This database is saved in a directory named the same under **/data**. It is automatically connected after installation.

- Select **Create** to create the folders and files. A confirmation is displayed.

If files with the same name already exist in the Geotec directory, a dialog box is displayed to select, if necessary, the files to be replaced by the default ones from Geotab.
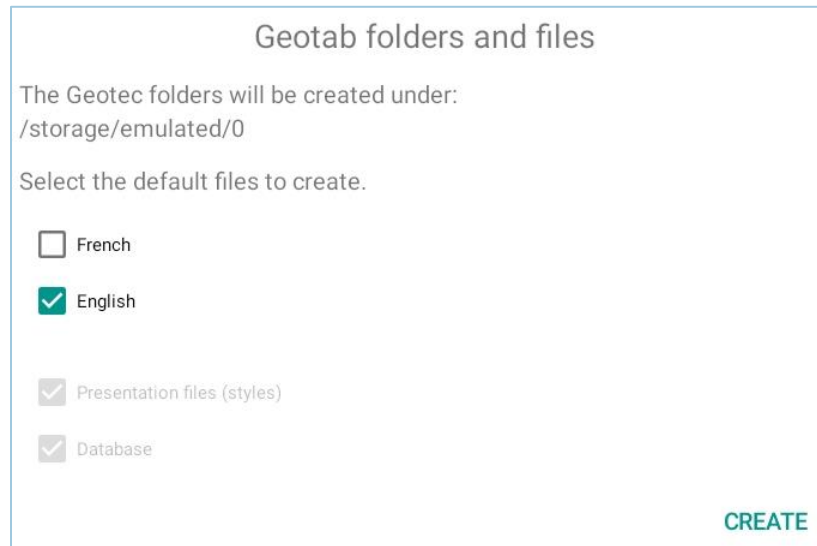
Figure 2 – Creation of Geotab folders and files

3. Items of home screen

The boring log is Geotab's home screen. All items located above the boring log are shown in Figure 3.

Figure 3 – Items of home screen

3.1. Connected database

The name of the connected database (*.db3) is indicated on the top left of the screen. The database can be changed via the options menu (paragraph 4.1).

We recommend the use of one database per project (paragraph 4.6).

3.2. Current site and boring

The current site and current boring are indicated on the top left of the screen. If a boring is selected, the corresponding boring log is displayed on the home screen. These numbers are also indicated in the entry forms.

To change the current site or boring, use the query icons (paragraphs 3.7 and 3.8).

3.3. Licence

The 1st icon displays the licence information (paragraph 2.1.1).

3.4.   Updates

This icon appears when a Geotab update is available. Click to download it. Then, follow the instructions of your tablet to launch the update.

3.5.   Moving and zooming

If the log is not shown entirely in width and / or height, it is possible to move it by touching the log with the stylus or 1 finger and moving as desired. It is also possible to zoom in the boring log by moving two fingers closer together or farther apart.

The 2nd icon (**Zoom**) opens a menu.

- Full width: the log takes up the entire width of tablet, whether in portrait or landscape mode

- Full height: the log takes up the entire height of tablet, whether in portrait or landscape mode

- Zoom 50%: the log is 2x smaller than on paper

- Zoom 100%: the log has the same dimensions as on paper

- Zoom 200%: the log is 2x bigger than on paper

- Zoom 400%: the log is 4x bigger than on paper

Please note that the display in **bitmap mode** (paragraph 4.10.3) is more effective for moving and zooming.

3.6.   Google Maps

If Internet is available, the 3rd icon opens **Google Maps** showing the location of the current boring with a red symbol and the location of the other borings in the current site with a blue symbol. No zooming or moving is currently possible. To be displayed on the map, the borings must have a longitude and a latitude (paragraph 9.1)

The menu is used to change between **roadmap**, **satellite**, **hybrid** or **terrain**.

3.7.   SITE query

The 4th icon (**Site query**) opens a dialog box showing all the sites defined in the connected .db3 database. By selecting a site, the log is reset and the site number is shown above the boring log (paragraph 3.2).

The + NEW value is used to create a new site. The Site form is then opened and a dialog box asks for the site number. See paragraph 8 for the details about Site.

3.8.   BORING query

The 5th icon (**Boring query**) opens a dialog box showing all the borings of the selected site defined in the connected .db3 database. By selecting a boring, the log is displayed and the boring number is shown

next to the site number, above the boring log (paragraph 3.2). If no site is selected, the list of borings shows those of all the sites in the database.

The + NEW value is used to create a new boring. The Boring form is then opened and a dialog box asks for the boring number. See paragraph 9 for the details about Boring.

3.9.   List and opening entry forms

The 6th icon open a menu with the **List of Geotab entry forms**. By clicking one of the choices, the corresponding form opens, showing the existing data or showing an empty form if no data has been entered before. See paragraphs 8 to 17 for all details about each form.

If no site has been selected, selecting any form opens the Site form to create one. Similarly, if no boring has been selected, selecting any form opens the Boring form to create one.

The forms can be opened directly by touching with a finger the desired column of the boring log. The corresponding form opens on the information touched. To open **Site**, touch the log header. To open **Boring**, touch the depth column.

4.   Options menu of home screen

The 3-dot icon above the boring log opens an options menu. The options are described in paragraphs 4.1 to 4.11.

4.1.   Open DB

The Geotec_en.db3 database is created at installation in the **/data/Geotec_en** directory. It is the database used by default after installing Geotab.

With **Open DB**, the user navigates to the directory containing the desired .db3 database on the tablet and selects it. Geotab then connects to the file and its name is indicated at the top left of the home screen. The site and boring numbers and the boring log are reset. Geotab always connects to the last database used.

If the database version is not the most recent (SYS_USER), the database is updated automatically to the latest version. A message is displayed for every change made to the database.

The **Connect SQL** and **Disconnect SQL** are for future developments.

4.2.   Open style

Two styles are created at installation under the **/style** directory, Borehole.sty and Trench.sty.

With **Open style**, the user navigates to the directory containing the desired .sty style file on the tablet and selects it. The new style is then displayed. As soon as a boring is retrieved or entered, the information is displayed in the corresponding columns. Geotab always connects to the last style used.

The style files can be created in Geotec on Windows and copied on the tablet.

4.3.   Open markers

The **Geotec8.mrk** markers file is created at installation under the **/style** directory and is used by default after installing Geotab.

When a markers file is opened, any column displaying curve points will show the marker designated in the style file. If no markers file is selected, the values of the curve points will still be present.

With **Open markers**, the user navigates to the directory containing another markers file on the tablet and selects it. Geotab always connects to the last markers file used.

4.4.   Open patterns

The **Geotec8.ptn** patterns file is created at installation under the **/style** directory and is used by default after installing Geotab.

When a patterns file is opened, any column showing filling pattern will display the pattern designated by the style file or the data. If no patterns file is selected, the data will be displayed textually.

With **Open patterns**, the user navigates to the directory containing another patterns file on the tablet and selects it. Geotab always connects to the last patterns file used.

4.5.   Open logo

With **Open logo**, the user navigates to the directory containing the desired image file on the tablet and selects it. If an image designated by $$logo is present in the style file used, the logo file is displayed. Geotab always connects to the last logo file used.

4.6.   Create project

Creating a new project generates a new directory under **/data** and a new database with the same name as the directory. With Geotab, all PDF files, photos and sketches generated are saved in the same directory as the database used.

The menu option **Create project** opens a dialog box to define the new project and its database.

The **database to copy** to create the new project can be:

- Either the **Geotec (default)** database, which contains all tables and fields as well as typical values for the data lists.

    o   With an **English** or **French** dictionary (table and field names)

- Either **another** Geotec database with customized lists and / or entry forms (paragraphs 7.5 and 7.6).

    o   Open the database to be copied with the **…** button. The complete path will be indicated in the field next to **Other**.

In the section **Project to create**:

- Enter the name of the new project.

- A folder with the same name will be created under **/data**.

- This folder will contain the *.db3 database with the same name.

If the option **Connect automatically to new project** is checked, Geotab will automatically connect to the new database after restarting Geotab.

Figure 4 – Create new project

4.7. Generate report

The menu option **Generate report** is used to create a PDF file of the current boring log, with the Geotab watermark. By clicking **Yes** in the dialog box, the PDF file is saved in the project directory. The file is named ***SITE_BORING_yyyymmdd-hhmiss.pdf***.

By checking the box **Send by email**, applications available on the tablet are suggested to send the generated boring report.

Figure 5 – Generate PDF report

4.8.   Export project

Exporting a project consists in sending via FTP, FTPs or email a .zip file containing the Geotab files of a project directory (database, photos, sketches and PDF boring reports). The menu option **Export project** opens a dialog box (Figure 6) to define the export parameters.

The list under **Project to export** presents all folder names in **/Geotab/data**. The current project is suggested by default. Only one project can be exported at once.

If the box **Include name of parent folder** is checked, the zip file includes the parent folder with all its files inside. If the box isn't checked, the zip file includes the files only.

The box **Keep connection parameters** can be checked to save the information of the FTP or FTPs account and the email address.

4.8.1.   Files to export

4.8.1.1   Resend last export

If at least one *Project_yyyymmdd-hhmiss.zip* file exists in the tablet under **/Geotec/export** for the **Project** selected, the most recent .zip can be resent via the option **Resend last export**. The file name is indicated in parentheses. If there is no .zip file for the Project, the option is deactivated.

The option is used to resent the same file via several types of export (email and FTP) or if an error occurred when sending the previous export (ex: incorrect connection parameters for the FTP account).

4.8.1.2   Create export

When the **Create export** option is checked, all Geotab files in the directory of the project are listed: Database, Boring reports, Photos and Sketches.

To create an export, there are two options for automatic selection:

- **All files**. All files will be checked.

- **Last export**. With this option, files whose creation or modification date is more recent than the date of the last *Project_yyyymmdd-hhmiss.zip* file (if it exists in **/Geotec/export** for the selected *Project* and whose date will then be indicated in parentheses) will be checked. If there is no .zip file for the project, the option is invisible.

The user can always modify the file selection with the checkboxes. The checkbox of a file type (ex: Boring reports) is used to select all or unselect all. Otherwise, open each tree structure to select specific files.

If no file of a certain type exists in the directory, the file type will not be shown.

4.8.2.   Type of export

The zip file can be sent to an **FTP** or **FTPS (implicit TLS) account** or by **Email**, depending on the radio button selected. It can also simply be created and sent manually by the user through a different app.

With the **FTP** or **FTPS (implicit TLS)** option, these values must be entered:

- **Host**: enter the domain name

- **Host directory**: enter the directory where the zip files will be exported to

- **Port**: enter the port

- **Login**: enter the username

- **Password**: enter the password

With the **Email** option, enter the recipient's email.

With the **Zip only** option, there is nothing else to enter.

Click on **Export**. The *Project_yyyymmdd-hhmiss.zip* file will be created, exported and saved under **/Geotec/export**.

Figure 6 – Export project

4.9. Reinstall Geotec

The menu option **Reinstall Geotec** opens the dialog box for the creation of Geotab folders and files (Figure 2). The use can recreate the 4 default presentation files (paragraph 2.2).

4.10. Parameters

The menu option **Parameters** opens a dialog box with the Geotab parameters (Figure 7).

Figure 7 – Parameters

4.10.1. Language

All menus, options, messages and labels of Geotab are displayed in the language set in the tablet. If the tablet's language is neither English nor French, English is used.

4.10.2. Orientation

The application can be forced in **Portrait** mode, **Landscape** mode or can change orientation **automatically** (default option).

4.10.3. Bitmap mode

With the **display in bitmap mode**, an image of the log is taken. Moving and zooming on the boring log is faster. This is the default mode. If the **display in bitmap mode** is not activated, the report is redisplayed after each move or zoom. The resolution of the log is greater but the display is slower.

4.10.4. Field format

With the **display of the field format**, any field in the entry forms that does not contain a value shows in gray the format of the values to enter. If the box is not checked, the fields without value are completely empty. Some examples:

t(6)	Text with up to 6 characters
N(3)	Integer with up to 3 digits
N(7.3)	Decimal number with up to 7 digits including 3 decimals (ex: 1234.123)
N(.3e)	Number with 3 decimals in scientific format. Enter the value in decimal numbers; it will be converted to scientific format
D(YYYY-MM-DD HH:MI)	Date with its format

4.10.5. Top depth

The **top depth d**efines the depth at which the boring log should start. It can be the one **imposed** by the user, or the one in the **style file** (default option). The top depth of the style file is indicated in parentheses next to the label.

Use a negative value to display a part above the ground surface level. Use a positive value to omit part of the log.

4.10.6. Depth scale

The **depth scale** for the boring log can be the one **imposed** by the user, or the one in the **style file** (default option). The scale of the style file is indicated in parentheses next to the label.

The scale is calculated as meter of ground / meter of paper. For example, at a 100% zoom, a scale of 100 indicates that 1m of ground is represented by 1 cm on the tablet; with a scale of 10, it's 0.1 m of ground that is represented in 1 cm on the tablet. In other words, the greater the scale, the more the boring log will be compressed.

4.10.7. Automatic calculation of X and Y coordinates

When the automatic calculation is checked, the calculation of the easting (X), northing (Y) and zone is done when the **GPS location** icon is touched in the Boring entry form (paragraph 9.1). Otherwise, only the longitudes and latitudes are retrieved by touching the location icon.

4.10.8. Display moisture before density / consistency

The soil description matrix (paragraph 11) generates the description in a predefined order:

Category. Material (size), gradation, shape, color, oxidation, density / consistency, plasticity, moisture, calcareous. Structure. Presence (%) (list of debris). Inclusions. Evidence of contamination.

Check the box **Display moisture before density / consistency** to change the order of these 2 items.

4.10.9. Support (reserved to Sobek)

For specific technical support cases, Sobek may ask to use the Support button.

4.11. About

The menu option **About** opens a dialog box with information about the Geotab version, the files connected, as well as details about the tablet used. The End-User Licence Agreement can also be found.

5. General items of entry forms

All entry forms have an items bar at the top of the form (Figure 8). The name of the form is indicated in blue at the top right. Depending on the form, some items are deactivated. Items specific to a form are described with the form (paragraphs 8 to 17).
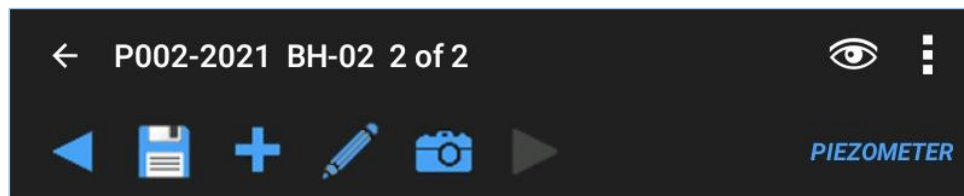
Figure 8 – General items of entry forms

5.1. Home and back

The **home** icon automatically saves data that were inserted or modified and returns to the log, which shows the changes. The **back** button of the tablet has the same function.

If the changes cannot be saved, for example if a required data is not entered or if saving would create a duplicate, a message is displayed. You can either correct the data or cancel the modification (paragraph 7.2).

5.2. Site and boring numbers

The **current site** and **boring numbers** are indicated at the top left of the form. All changes are done for this boring. To modify the data of another boring, select it via the query icons in the home screen (paragraphs 3.7 and 3.8).

If the boring has not been selected yet, the Site form only shows the site number. Opening any other form requires the creation of a boring.

5.3. Number of records

In the SAMPLE and PIEZOMETER forms, the total number of samples/sub-samples or piezometers in the current boring is indicated. In ALL TABLES, the number of records for the selected table is indicated. The position of the current record is also indicated. This position is based on the alphabetic order; it has no effect on the data.

5.4. Observations

In all the entry forms except Site, the **Observations** icon is present. It opens a tabular form to describe any observation or remark from the field, at a given depth. See paragraph 16.

5.5. Previous

The 1st blue icon (**previous**) is active in the SAMPLE and PIEZOMETER forms, when at least 2 records exist for the current boring. It is also active in ALL TABLES, when at least 2 records exist in the selected table. It is used to go to the previous record. When **Previous** is touched, any modification is automatically saved.

Use a **long** click on the **Previous** icon to go directly to the **first** record.

5.6. Save

The 2nd icon (**save**) becomes active as soon as a change is done in the current form. When the changes are saved, the diskette becomes inactive again until the next change

5.7. Insert

The 3rd icon (**insert**) is active in BORING, SAMPLE, PIEZOMETER and ALL TABLES. It is used to insert a new empty record. When **Insert** is touched, any modification is automatically saved. See the description of these entry forms for details about the automatisms when inserting a new record.

5.8. Sketch

The 4th icon (**sketch**) is active in all forms, except Site. It opens a sketching window integrated to Geotab. The sketching window is shown in Figure 9 (the white page takes up the entire screen of the tablet). On opening, the page is blank.

This icon is used to create a **new blank page**. A message indicates that all changes will be lost.

This icon is used to choose the **size of the brush**, between 4 choices. All following strokes will have this diameter. The buttons at the bottom of the sketching window are used to choose the **color of the strokes**.

This icon is used to choose the **size of the eraser**, between 4 choices. The eraser is displayed in black following the movement of the stylus or finger during editing, to indicate what will be erased. When the stylus or finger is lifted from the tablet, the image is refreshed.

This icon is used to **save the sketch**. The sketch will be saved in the project folder, at the same location as the database.

- o A message asks to save, or not, the sketch. After, the sketching window closes and returns to the current form.

- o If the **sketch** was called from the Sample form, the sketch is named **SITE_BORING_SAMPLE_yyyymmdd-hhmiss.png**

o   If the **sketch** was called from any other form, the sketch is named ***SITE_BORING_yyyymmdd-hhmiss.png***

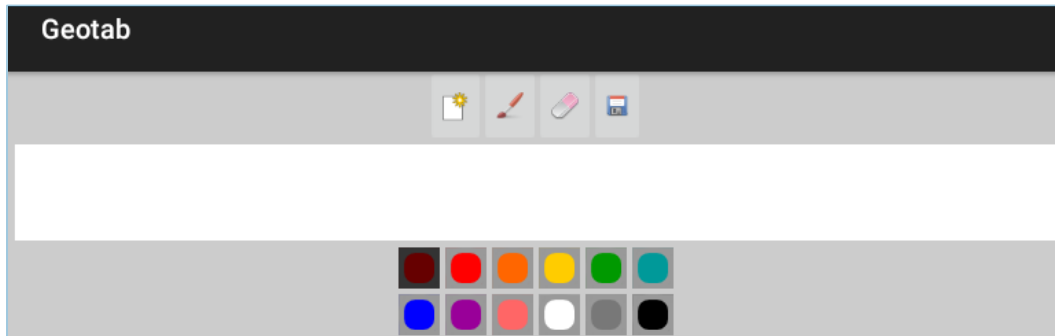The tablet's **back** button opens a message to save the file.

Figure 9 – Creation of sketches

5.9.   Photo

 The 5th icon (**Photo**) is active in all forms, except Site. It opens the Camera application of the tablet. The photo is saved in the project folder, at the same location as the database.

*   If the **photo** was called from the Sample form, the photo is named ***SITE_BORING_SAMPLE_yyyymmdd-hhmiss.jpg***

*   If the **photo** was called from any other form, the photo is named ***SITE_BORING_yyyymmdd-hhmiss.jpg***

5.10. Next

The last icon (**next**) is active in the SAMPLE and PIEZOMETER forms, when at least 2 records exist for the current boring. It is also active in ALL TABLES, when at least 2 records exist in the selected table. It is used to go to the next record. When **Next** is touched, any modification is automatically saved.

Use a **long** click on the **Next** icon to go directly to the **last** record.

6.   Characteristics of entry forms

6.1.   Swiping

When an entry form is opened, go to the next one by swiping to the left or to the right, with the stylus or 1 finger. The virtual order of the forms, from left to right, is Site - Boring - Sample - Stratigraphy - Piezometer – Pen Test - Vane Test. Any modification is automatically saved when swiping.

6.2.   Required values

In all the forms, at least one field is required. These values are indicated by an <u>asterisk</u>. If no value is present in a required field, the record cannot be saved.

The required values make each record unique. If a value in a required field would create a duplicate, it is not possible to save either.

6.3.   Calendar

For all date fields, the calendar opens the Android's date editor. By clicking OK, the date and time are inserted, without the seconds. By clicking Erase, the date is deleted from the field.

6.4.   Lists of values

Most « Text » fields have a list of values or a list that can be created.

The drop-down lists show either records from the LIST_ENG table (or LIST_FRE if Geotab is used in French) or the values entered for the same field in other records of the database.

The values of the LIST_ENG table (or LIST_FRE if Geotab is used in French) can be edited via **Edit drop-down lists** of the options menu (paragraph 7.6). The type of drop-down list to use is defined via **Customize form** of the options menu (paragraph 7.5).

The +NEW element opens the dialog box shown in the next paragraph, to add new elements to the drop-down LIST of the current field, saved in the LIST_ENG table (or LIST_FRE if Geotab is used in French).

6.5.   Long click

A long click can be done on any field of the entry forms. A dialog box opens to EDIT the value.

The dialog box can also be used to CUSTOMIZE the field and to edit the drop-down LIST values. These options are the same as in the options menu (paragraphs 7.5 and 7.6) but for one field only.

Figure 10 – Field editing box

6.6.   Tables

The forms either show single records, multiple records in table format, or a combination of both.

Tables are used to show secondary data belonging to a main record. The headings indicate field names, with the required fields having an asterisk.

6.6.1. Insert

The **insert** icon is available right of the last existing row. It adds a new row after the others. At any time, a new empty row is automatically displayed after the existing rows when opening the form.

6.6.2. Delete

If a checkbox left of a row is selected, the **Delete** icon appears in the items bar at the top of the form, next to the Observations icon.

By touching the icon, a message indicating the table involved asks to confirm the deletion. By clicking No, nothing is done and the selection is canceled. By clicking Yes, the record is deleted and the form remains open. Several rows can be selected and deleted at once.

6.6.3. Horizontal scrolling

The **expand** icon, at the top left of the tables, is used to activate horizontal scrolling and widen the remark. Scrolling is then possible by placing a finger or stylus inside the table and moving right or left.

When the table is expanded, the **shrink** icon becomes available to return to the default display without horizontal scrolling.

7.   Options menu of entry forms

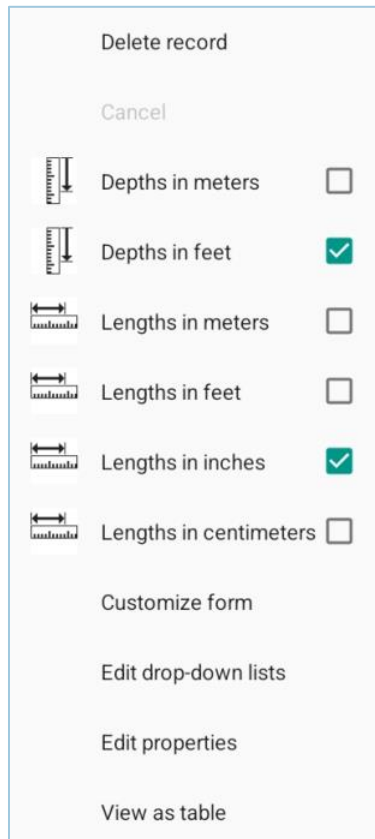The 3-dot icon of the entry forms opens an options menu (Figure 11). Some of the options depend on the entry form.

Figure 11 – Options menu of entry forms (Sample form)

7.1. Delete record

The **delete record** option is used to delete the current record. If the record has child records (ex: boring containing samples), the deletion is not possible, except when the data are from the same entry form (bottom table).

A message indicating the table involved asks to confirm the deletion. By clicking No, nothing is done. By clicking Yes, the record is deleted and the form is closed to return to the boring log.

7.2. Cancel

The **cancel** option is used to cancel any change and return to the log. A message asks to confirm the cancelation. By clicking No, nothing is done. By clicking Yes, the modifications are cancelled and the form is closed to return to the boring log.

7.3. Depth units

The entry forms that have depth fields have the option of **depths in meters** or **depths in feet**.

The "m" or "ft" unit is indicated next to the depth fields based on the selected option. The user enters the values in the selected unit, but the values are saved in the database in the unit system specified in the Site entry form, either international system SI or imperial system IM (paragraph 8).

7.4. Length units

The Sample and Piezometer entry forms have the option of **lengths in meters** or **lengths in feet**. The Sample form also has the option of **lengths in inches** or **lengths in centimeters**.

The "m", "ft", "in" or "cm" unit is indicated next to the length fields based on the selected option. The user enters the values in the selected unit, but the values are saved in the database in the unit system specified in the Site entry form, either international system SI, in meters, or imperial system IM, in feet (paragraph 8).

7.5. Customize form

The **Customize form** option is used to personalize the current form. The option opens a tabular form that lists all fields of the current table (Figure 12).

All fields displayed by default in the entry from cannot be hidden and are grayed out.

- To add another field in the current form, **check its box**. It will be displayed after the default fields.

- The added fields are displayed after the default fields based on the **order** indicated. Modify the number to reorder them, if desired.

- For "Text" fields, you can define the type of drop-down list to use.

  o 0: Default (values from LIST_ENG table, if none, existing values in the database for the current field)

  o 1: Distinct (existing values in the database for the current field)

  o 2: Value (values from LIST_ENG table for the current field, only one choice)

  o 3: Description (descriptions from LIST_ENG table for the current field, only one choice)

  o 4: + Value (same as 2, but the choices are concatenated after each selection)

  o 5: + Description (same as 3, but the choices are concatenated after each selection)

  o 6: None (no list opens)

- The entry form **format** can be modified for numeric fields only. For example, %7.3f means 3 decimals, %7.1f means 1 decimal, etc.

- The suggested **label** for the added fields is the same as the field name, but can be modified.

Use **Reset** to bring back the default values suggested by Geotab.

All changes in **Customize form** are saved in the connected database.

For the creation of new projects, if it possible to use a database other than the default one. It can have lists (paragraph 7.6) and entry forms predefined and customized based on needs of a division or a company. To do this, open the *template* database and use the **Customize form** tool for the forms to modify. All new projects using this *template* database will have predefined lists and forms based on needs. See paragraph 4.6 for the creation of projects.

Field		Order	List		Format	Label
SITE_NO	☑	3	0	▼	%20s	Site_no
BORING_NO	☑	4	0	▼	%20s	Boring_no
SAMPLE_NO	☑	5	0	▼	%20s	Sample_no
GENERIC_NO	☑	6	0	▼	%19s	Generic_no
SUB_SAMPLE	☑	7	0	▼	%1s	Sub_sample
DEPTH	☑	8	0		%7.3f	Depth
LENGTH	☑	9	0		%7.3f	Length
SAMPLING_DATE	☑	10	0		%s	Sampling_date
TYPE	☑	1	1	▼	%3s	Type
STATE	☑	11	0	▼	%1s	State
CATEGORY	☐	12	0	▼	%20s	Category
PROP	☐	13	0		0 -> Default	
CODE1	☐	14	0		1 -> Distinct	
CODE2	☐	15	0		2 -> Value	
CODE3	☐	16	0		3 -> Description	
CODE4	☐	17	0		4 -> + Value	
CODE5	☐	18	0		5 -> + Description	
COLOR	☐	19	0		6 -> No list	
MAX_SIZE	☐	20	0			
BOULDERS	☐	21	0	▼	%8s	Boulders

Customize form SAMPLE

RESET   CANCEL   OK

Figure 12 – Customize form

7.6.   Edit drop-down lists

The **Edit drop-down lists** option is used to add, modify or delete values from the drop-down lists in the LIST_ENG table. These lists are used in the entry forms, except for fields whose type of drop-down list is "1: distinct" or "6: no list" (paragraph 7.5). The option opens a tabular form that lists all records for the current table (Figure 13).

- The **table** is the current table and cannot be modified.

- The **field** can be selected from the drop-down list. The list suggests all fields for the current table. The field is required.

- The **value** is typically an abbreviation. It is the element selected when the type of drop-down list is "2: value" or "4: + value" (paragraph 7.5). The value is required.

  *** If the point (.) is used as value, it is the description that is entered in the field.

- The **description** is selected when the type of drop-down list is "3: description" or "5: + description" (paragraph 7.5). The description is required.

- The **order** is used to force a display order in the list. The elements are displayed numerically (from 0), followed by the elements without order. The elements with the same order are displayed alphabetically.

- A **color** associated to the element can be selected via the palette. This color is used for curves of type Color.

- The number of the **pattern** associated to the element can be entered. This pattern is used for curves of type Pattern.

To **add** a new row, click on + at the bottom of the form.

After modifying a row, click OK to save the changes.

To **delete** a row, check its box and click on Delete which appears at the bottom of the form.

All changes to the lists are saved in the connected database.

For the creation of new projects, if it possible to use a database other than the default one. It can have lists and entry forms (paragraph 7.5) predefined and customized based on needs of a division or a company. To do this, open the *template* database and use the **Edit drop-down lists** tool. All new projects using this *template* database will have predefined lists and forms based on needs. See paragraph 4.6 for the creation of projects.

🗑	Table*	Field*		Value*	Description*	Order	Colo
☐	SAMPLE	CALIBER	▼	AQ	Core diameter: 27 mm		
☐	SAMPLE	CALIBER	▼	B	Split spoon 51 mm		
☐	SAMPLE	CALIBER	▼	BQ	Core diameter: 36 mm		
☐	SAMPLE	CALIBER	▼	BX	Core diameter: 42 mm		
☐	SAMPLE	CALIBER	▼	H	Split spoon 75 mm		
☐	SAMPLE	CALIBER	▼	HQ	Core diameter: 48 mm		
☐	SAMPLE	CALIBER	▼	HX	Core diameter: 76 mm		
☐	SAMPLE	CALIBER	▼	N	Split spoon 63 mm		
☐	SAMPLE	CALIBER	▼	NQ	Core diameter: 63 mm		
☐	SAMPLE	CALIBER	▼	NX	Core diameter: 55 mm		
☐	SAMPLE	CALIBER	▼	PQ	Core diameter: 85 mm		
☐	SAMPLE	CALIBER	▼	PW	Split spoon 140 mm		
☐	SAMPLE	CATEGORY	▼	.	Bedrock		
☐	SAMPLE	CATEGORY	▼	.	Fill		
☐	SAMPLE	CATEGORY	▼	.	Natural soil		
☐	SAMPLE	CATEGORY	▼	.	Tailings		
☐	SAMPLE	CATEGORY	▼	.	Till		
☐	SAMPLE	COLOR	▼	.	Black		
☐	SAMPLE	COLOR	▼	.	Bluish black		
☐	SAMPLE	COLOR	▼	.	Bluish grey		

Edit drop-down lists of SAMPLE

\+   CANCEL   OK

Figure 13 – Edit drop-down lists

7.7. View as table

The **View as table** option is used to see all the fields of the entry form as a table. See paragraph 17 for the description of the ALL TABLES form.

8. SITE form

The SITE form is used to identify and describe a site. It is opened via the list of forms at the top of the main screen or by touching the log header.

- The **site number** is required. It contains 20 characters maximum.

  - The site number can only contain letters, numbers and the following characters: the dash, the parentheses, the dot and the underscore. Accents are not allowed.

  - When inserting a new site, the site number must be entered in the dialog box. A number is necessary to insert other data.

  - For an existing site, it is possible to modify its number by activating its field. A dialog box opens to enter the new number. All dependent records will be modified.

- A **structure** number can be entered, with 20 characters maximum.

- The **unit** system is SI (international system) or IM (imperial system). It indicates if the depth and length values entered in the database are considered to be in SI or IM units. **By default, SI is selected.** The unit conversions in the entry forms are still applicable (paragraphs 7.3 and 7.4).

Figure 14 – SITE form

- The user chooses the **MTM** or **UTM** coordinate system for his site. The information is used for the boring coordinates. **By default, MTM is selected.**

- The user chooses the **NAD27** or **NAD83** projection system for his site. The information is used for the boring coordinates. **By default, NAD83 is selected.**

- The **zone** where the site is located is entered. Automatically, the zone will be copied as the zone of its borings, but remain modifiable.

- The **location** of the site can be described in details, with 255 characters.

- The **description** is used to add information about the site, with 255 characters.

9.   BORING form

The BORING form is used to identify and describe the borings of a site. It is opened via the list of forms at the top of the main screen or by touching the depth column in the log.

9.1.   Generalities

- The **boring** number is required. It contains 20 characters maximum.

  o   The boring number can only contain letters, numbers and the following characters: the dash, the parentheses, the dot and the underscore. Accents are not allowed.

  o   When inserting a new boring, the boring number must be entered in the dialog box. A number is necessary to insert other data.

  o   For an existing boring, it is possible to modify its number by activating its field. A dialog box opens to enter the new number. All dependent records will be modified.

- The boring **type** is a 2-character code that indicates the nature of the boring. The default codes present in the Geotec database are listed below. When type **HA**, **TP** or **TR** is selected, the third button in the Boring entry form is labelled "TRENCH" (paragraph 9.5). Otherwise, the third button is labelled "CASINGS" (paragraph 9.4).

Table 1 – Default types of borings

Code	Description	Code	Description
AS	Auger sampler hole	MA	Manual sampling
AT	Air track	PT	Dynamic penetration test
BH	Borehole	PZ	Stand alone piezometer
CO	Cobra	QC	Quality control
CP	Piezocone	SP	Static penetrometer
GP	Guelph permeameter	TP	Test pit
HA	Hand auger	TR	Trench

- The **boring dates**, in "yyyy-mm-dd hh:mi" format, are selected via the calendar icon. **By default**, the current date and time are entered when creating a new boring.

- The **location** of the boring can be described in details, with 80 characters.

- The coordinate and projection systems of the site are also displayed for the boring, as information. The information is used to calculate boring coordinates.

- The **zone** where the boring is located is entered. The zone of the site is copied by default but can be modified.

Figure 15 – BORING form

- The **longitude** and **latitude** of the boring are retrieved or calculated; in degrees.

  o The longitude and latitude of the tablet are retrieved by touching the **GPS location** icon. The easting (X), northing (Y) and zone are also calculated if the coordinate and projection systems are defined and if the automatic calculation option is checked (paragraph 4.10.7).

    i. The **GPS** location of the **tablet** must be activated.

    ii. The option **Enable GPS** in the options menu of the Boring form must be checked.

  o If the **longitude** and **latitude** of the boring are saved, the **Google Maps** icon becomes active and opens Google Maps to see the location of the current boring with a red symbol and the location of the other borings in the current site with a blue symbol. No zooming or moving is currently possible. The same map can be opened via the home screen (paragraph 3.6).

- The **X** and **Y coordinates** of the boring are entered or calculated

  o The arrow buttons ← and → are used to calculate the longitude and latitude based on X, Y and the zone, or the X, Y and zone based on the longitude and latitude, respectively. The coordinate and NAD systems are necessary for the calculations.

- The **reference** is a string of 40 characters used to indicate the reference type for the boring (for example: geodesic, arbitrary).

- **Z** is the ground elevation at the boring's location.

- The **total depth** of the boring is incremented **automatically** as data are entered in the Sample, Stratigraphy, Vane Test or Pen Test forms. It can be modified manually.

- The **equipment** used is entered, with 40 characters.

- The type of **hammer** used for driving the sampler is entered, with 40 characters.

- The **contractor** who completed the boring is entered, with 80 characters.

- The **driller**, the **technician** and the **project manager** can be entered; with 40 characters.

- A **remark** containing up to 255 characters is used to add information about the boring.

9.2. Insert new boring

The **Insert** icon is active at the top of the form when editing the Generalities. It is used to create a new empty boring, but by copying information of the current boring: the type, zone, reference (z), and values from equipment to remark. After entering the new boring number, the entry form closes to return to the report of the new boring.

9.3. Water table

The **Water table** button is used to enter information about 2 water measurements done during drilling.

- The **measurement date**, selected via the calendar

- The **casing depth** at the time of measurement

- The **stabilization time**, in hours

- The **water depth**

9.4. Casings

When the boring type is neither **HA**, **TP** nor **TR**, the 3rd button in the Boring entry form is labelled "CASINGS". The form is used to input the different boring methods used and their driving mode.

- The **top** and **bottom depths** are required. They indicate the depths between which the boring method was used.

- The **type of drilling** is indicated with 40 characters.

- The **method of drilling** is indicated with 80 characters.

- The **caliber** of the casing used is entered.

- The driving **mode** contains a 1-character code.

- A **remark** can be added.

9.5. Trench

When the boring type is **HA** (hand auger), **TP** (test pit) or **TR** (trench), the 3rd button in the Boring entry form is labelled "TRENCH".

- The **length** and **width** of the trench are entered.

- The type of **refusal** during the excavation is indicated with a 1-character code; for example: "R" for refusal on rock, "B" for refusal on boulder, etc.

- The **method** or excavation equipment is entered with 40 characters.

- The **excavation difficulty** is entered; with 255 characters.

- The **wall stability** can be described with 255 characters.

- The **depth** of the **water** inflow is entered.

- A description of the **water conditions** is entered; with 255 characters.

- The top and bottom **depths** of an **oxidized zone** can be entered.

- A description of the **oxidation conditions** is entered with 255 characters.

- A **remark** can be added.

Figure 16 – TRENCH form

10. SAMPLE form

The SAMPLE form is used to identify and describe the samples taken along a boring. It is opened via the list of forms at the top of the main screen or by touching a sample column in the log.

The **Insert** icon is active at the top of the form when you navigate to the last sample of the boring view the Next icon (paragraph 5.10). The entry form is then waiting for the sample state to be selected. It's the same when you enter the form to describe the first sample.

- The **depth increment** can always be entered. A new sample will be positioned at a depth equal to the top depth of the preceding sample plus the increment. If this depth is smaller than the bottom depth of the preceding sample, it is the bottom depth of the preceding sample that will be used.

  Without an increment, we consider continuous sampling. A new sample will be positioned at a depth equal to the bottom depth of the preceding sample.

- Select the sample **state**. The entry form adjusts based on the state selected (see specific fields, below).

    o A default type and length are associated to each state. They can be specified by editing the drop-down list of the STATE field (paragraph 7.6).

        o The values must be G, R, I and C.

        o The descriptions are specified as "label, type, length" (in meters).

        o If the types and lengths are not specified, Geotab uses:

            C → Rock core, CR, 1.524

            G → Grab, GB, 0.3048

            I → Undisturbed, ST, 0.6096

            R → Remoulded, SS, 0.6096

Figure 17 – Sample state and default values

    o Remoulded state:

        o The casing **caliber** is entered; with 10 characters. The caliber of the previous sample is entered by default.

        o The number of **blows per 6" (N1** to **N4**) are entered; integers.

        o The sum of **N2** and **N3** is entered in the field **N** which contains the standard penetration value. The value of **N** can be modified.

        o A **remark on N** can be entered.

    o Undisturbed state: The **tube number** of the undisturbed sample can be entered, with 10 characters.

    o Rock core state:

        o The core **caliber** is entered; with 10 characters. The caliber of the previous sample is entered by default.

        o For **RQD**, you can either enter the cumulative **length** of core pieces greater than 4 inches, or the **RQD percentage** directly. The other value is always calculated.

- Edit the **sample number**, if needed. It is required. It contains 19 characters maximum.

  o The No of the first sample is suggested as 01. This number can be modified by activating its field. The number of the new samples of the current boring will be based on the previous sample (value and number format). For example:

    With 002, the next one is 003.

    With GL-11, the next one is GL-12.

  o The sample number can only contain letters, numbers and the following characters: the dash, the parentheses, the dot and the underscore. Accents are not allowed.

- The **sampling date**, in "yyyy-mm-dd hh:mi" format, is selected via the calendar icon. **By default**, the current date and time are entered when creating a new sample.

- The sample **type** is a 3-character code to indicate the type of sampler used to extract the sample. A type is associated to each state by default, but can be modified. The default codes present in the Geotec database are listed below:

Table 2 – Default types of samplers

Code	Sampler	Code	Sampler
AS	Auger sampler	**SC**	Split corer
CT	Corer tube	**SS**	Split spoon
DC	Diamond rock core	**ST**	Thin wall sampler (Shelby)
GB	Grab sample	**TW**	Thin wall sampler
MA	Manual	**VI**	Vibration
PS	Piston sampler	**WC**	Water content
QC	Quality control sample	**WS**	Wash sample

- The sample **depths** (from **top** to **bottom**) are entered. If both depths are entered, the sample length is calculated.

- The sample **length** is either calculated by entering the bottom depth, or entered directly. The bottom depth is then calculated. A length is associated to each state by default, but can be modified.

- For all states except Grab, the **recovery** can be entered, either the **recovery length**, or the **recovery percentage** directly. The other value is always calculated.

- The sample **description** can be done via the soil description matrix, via the icon. The matrix is described in paragraph 11. The description can also be entered manually, with up to 511 characters.

Figure 18 – SAMPLE form

10.1. Sub-samples

You can add sub-samples to the current sample via the **Add sub-sample** button.

- The **Add sub-sample** button is active when:

  o The current sample is saved and does not contain sub-samples, or

  o The current sub-sample is the last of the sample, and the bottom depth of the sample has not been reached.

- By clicking on the button, the **number** of the 1st sub-sample is set to 'A'. The value can be modified but must have only 1 character. The number of the following sub-samples is incremented alphabetically.

- o This number is automatically concatenated to the number of the main sample and copied in the field SAMPLE_NO of the database (ex: 2A, 09B)

- The sub-sample **depths** (from **top** to **bottom**) are suggested by Geotab. They can be modified.

  - o The top of the 1st sub-sample is suggested as the top of the main sample.

  - o The top of the following sub-samples is suggested as the bottom of their preceding sub-sample.

  - o The bottom of the sub-samples is suggested as the bottom of the main sample, except for sub-sample A which must be entered.

- The sub-sample **length** is either calculated by entering the bottom depth, or entered directly. The bottom depth of the sub-sample is then calculated.

- The **description** of the sub-sample is done the same way as the main sample. Logically, if sub-samples are present, the main sample will not be described.

10.2. Property values

The bottom table presents various properties for which 2 values and 1 remark can be entered, for each sample or sub-sample. These values are saved in the PROPERTY_VALUE table of Geotec.

View all samples of the current boring with their properties and values via the **Property values** icon in the items bar, which opens a tabular form (Figure 19).

Click on a column heading to list the rows in ascending or descending order of its values. Click on the heading and select None to remove the ordering. By default, the rows are ranked by sample number, then by property.

If depths the PROPERTY VALUE table differ from the sample or sub-sample depths saved in the SAMPLE table, the corrected depths are then displayed in red in the tabular form. Click on Save and the corrected depths will be saved. To **delete** a row, check its box and click on Delete which appears at the bottom of the form.

Figure 19 – Property values in a boring

10.2.1. Edit properties

The in-situ properties are specific to samples or sub-samples. The **Edit properties** option of the options menu is used to add, modify or delete properties in the database. The option opens a tabular form that lists all properties (Figure 20).

- The **property** is required. If records exist for this property, it cannot be deleted.

- The **category** is used to define the type of property.

- The **unit** is for the property values.

- The **format** is used to better view the values – whether in scientific format or without decimals.

- The **rank** is used to force a display order in the table, from the smallest to largest number. To hide a property from the table, use a rank of 0.

- Th type of drop-down list for the remark of each property can be defined. In table LIST_ENG, the table name is PROPERTIES and the field name is the name of the property
  (ex: PROPERTIES and CONTAINER).

  o 0: Default (values from LIST_ENG table, if none, existing values in the database for the current field)

  o 1: Distinct (existing values in the database for the current field)

  o 2: Value (values from LIST_ENG table for the current field, only one choice)

  o 3: Description (descriptions from LIST_ENG table for the current field, only one choice)

  o 4: + Value (same as 2, but the choices are concatenated after each selection)

  o 5: + Description (same as 3, but the choices are concatenated after each selection)

    o   6: None (no list opens)

To **add** a new row, click on + at the bottom of the form.

After modifying a row, click OK to save the changes.

To **delete** a row, check its box and click on Delete which appears at the bottom of the form.

All changes to the properties are saved in the connected database.

🗑	PROPERTY*	CATEGORY	UNITS	FORMAT	RANK	LIS
☐	CONTAINER			%d	1	5
☐	LEL	enviro	%	%7.1f	3	2
☐	VOC	enviro	ppm	%7.3f	2	2
				%7.3f	1	2

  +   CANCEL   OK

Figure 20 – Edit properties

10.3. Automatic creation of layers

The icon to **Add a stratigraphic layer** appears in the items bar at the top of the Sample form, to automatically create layers from samples. When the icon is touched, a new layer is proposed.

- The layer always begins at the bottom depth of the previous layer, or at 0 if there is no layer yet.

- The layer ends:

    o   At the top depth of the current sample or sub-sample if **its Description is empty**.

    o   At the bottom depth of the current sample or sub-sample if it **has a Description**.

- A weighted average of the description of all samples and sub-samples found between the top and bottom of the layer is used to generate the layer.

The description matrix is displayed with a summary of all samples included. The values can be modified for the new layer. By clicking OK, the layer is saved.

If the top depth of the layer to be created is greater or equal than the bottom depth, the title of the matrix is in red and it is not possible to create the layer.

11. Soil description matrix

The **soil description matrix** is used to describe soils from samples, sub-samples and stratigraphic layers. By selecting all descriptive elements, the textual description is automatically generated. The matrix is opened via the icon next to the Description field.

The sample or sub-sample number, or the layer depths are indicated at the top right of the entry form.

By clicking on **Copy previous sample** or **Copy previous layer** button, the matrix information from the previous record are copied, and the description is generated based on the elements. Any manual addition is not copied.

All elements below the description can be closed by clicking on their label. They remain close until reopened.

The definition of different items can be display with a long click on the checkbox or the radio button.

Use **Cancel** to exit the matrix without keeping the changes. Use **OK** to exit the matrix and save the generated description in the field **Description**. It will replace a description that was already entered.

Category

This is the main type of soil or rock. The drop-down list can be edited (paragraph 7.6).

The category can be presented in the style file in bold, italic, underline and/or capital letters.

Materials

The materials can be selected at 2 places:

- Either via the **drop-down list** at the top right of the matrix. Only one can apply per sample or layer.

- Either via the option buttons to indicate the proportions of clay, silt, sand and gravel.

    o   The first material selected is set to 'Main'.

    o   Only two materials can be selected as 'Main'; the third being automatically set to 'Adjective' for a maximum of 100% material.

    o   To remove a material selection, touch the radio button again.

The codes corresponding to the materials selected (either from the drop-down list, the proportions table or the presences) are indicated as title of the drop-down list, as information. Up to 6 materials can be selected. The proportions are also indicated next to the drop-down list, with the first number corresponding to the first code, etc. The patterns associated to the codes and proportions are displayed in the log.

- A main material (from the table or the scrolling list) has a proportion of 1 (> 35%)

- An adjective has a proportion of 2 (20-35%)

- 'Some' has a proportion of 3 (10-20%)

- 'Trace' or 'Presence' has a proportion of 4 (< 10%)

Figure 21 – Soil description matrix

Presence (%) of cobbles, boulders and organic matter

You can add the percentage of cobbles, boulders and organic matter in the text field, as well as the maximum diameter. To see it in the description, check its box.

Debris

This is used to list all the debris. The drop-down list can be edited (paragraph 7.6). To add up the debris, use the type of list "+ description" (paragraph 7.5). To see it in the description, check its box.

Color

The color can be entered. It is included in the description. The drop-down list can be edited (paragraph 7.6).

Structure

The soil structure can be entered. It is included in the description. It can provide information about the geologic origin, the in-situ permeability, the contaminant pathways, etc. The drop-down list can be edited (paragraph 7.6).

Inclusions and contamination

Any inclusion or contamination can be indicated here. The drop-down lists can be edited (paragraph 7.6), and concatenation can be used (paragraph 7.5). These values are added at the end of the description.

Particle size

When sand is selected in the proportions table, the Sand item appears at the bottom of the matrix. Same thing with gravel. Up to 2 checkboxes can be selected. The particle size will be indicated in parentheses in the description.

Gradation

A gradation can be defined. One checkbox can be selected. It's included in the description.

Density or consistency

If we have a clay or a silty clay with no other main material, the **Consistency** item is present and up to 2 checkboxes can be selected. Otherwise, the **Density** item is present and up to 2 checkboxes can be selected. It is possible to force the use of Density or Consistency via the **Cohesionless / Cohesive button** at the top left.

If the N-value is entered in the sample definition, the corresponding density or consistency is automatically selected based on Table 3.

Table 3 – Density or consistency based on N-value

N-value	Density		N-value	Consistency
< 5	Very loose		< 3	Very soft
5-10	Loose		3-4	Soft
11-30	Compact		5-8	Firm
31-50	Dense		9-15	Stiff
> 50	Very dense		16-30	Very stiff
			> 30	Hard

Oxidation

The oxidation state can be defined. One checkbox can be selected. It's included in the description.

Plasticity

The plasticity can be defined. Up to 2 checkboxes can be selected. It's included in the description.

Particle shape

When gravel, cobbles or boulders is selected, the Shape item appears at the bottom of the matrix. Up to 2 checkboxes can be selected to describe the angularity. The particle shape is included in the description.

Moisture

The moisture can be defined. Up to 2 checkboxes can be selected. It's included in the description.

Calcareous

The calcareous state can be defined. Up to 2 checkboxes can be selected. It's included in the description.

Description

The soil description is generated based on the elements in the matrix, in the following order:

Category. Material (size), gradation, shape, color, oxidation, density / consistency, plasticity, moisture, calcareous. Structure. Presence (%) (list of debris). Inclusions. Evidence of contamination.

If needed, it can be manually modified. When the matrix is opened, if the description is different from the automatically generated description, it is displayed in red to draw attention.

12. STRATIGRAPHY form

The STRATIGRAPHY form is used to describe the stratigraphy along a boring. It is opened via the list of forms at the top of the main screen or by touching a stratigraphy column in the log.

- The classification **type** is required.

  o **End of boring** (type E): to add a description explaining the conditions of the end of the boring, which will be displayed at the bottom of the boring log.

  o **Rock** (type R): the top depth of the 1st rock layer is copied in the ROCK_DEPTH field of the boring.

  o **Simplified** (type S): to select up to 6 soil materials constituting the layer.

  o **Text** (type T): to display a remark at any depth.

  o **Unified** (type U): for future development, with the selection of the unified classification.

- The **top depth** of the layer is required. By default, the top of the 1st layer is 0 meter (or feet). The top of the following layers is equal to the bottom of their preceding layer. These values can be modified.

- The **bottom depth** of the layer is entered, if applicable. A bottom depth is necessary to display the layers of type S, R and U.

- The layer **description** can be done via the soil description matrix with this icon. The matrix is described in paragraph 11. The description can also be entered manually, with up to 511 characters.

Figure 22 – STRATIGRAPHY form

13.   PIEZOMETER form

The PIEZOMETER form is used to define the characteristics of piezometers, as well as various layers of materials used during their installation and the piezometric levels recorded. It is opened via the list of forms at the top of the main screen or by touching a piezometer column in the log.

The form is separated in two sections. The top is used to describe the piezometers. The bottom is used to enter information about the seals and the piezometric levels (paragraphs 13.4 and 13.5).

The following information is general. See paragraphs 13.1 to 13.3 for information specific to the Hydraulic (open tube), Pneumatic and Vibrating chord (electric) piezometers.

- The **piezometer number** is required. It contains 20 characters maximum.

   o   The piezometer number can only contain letters, numbers and the following characters: the dash, the parentheses, the dot and the underscore. Accents are not allowed.

- o The suggested number of the 1st piezometer of a borehole is 1, the second is 2, etc. This number can be modified by activating its field. A dialog box opens to enter the new number.

- The **installation date**, in "yyyy-mm-dd hh:mi" format, is selected via the calendar icon. **By default**, the current date and time are entered when creating a new piezometer.

- The 3 fields on the following line are used to describe the screen (filter).

  - o The **bottom depth** of the screen (filter).

  - o The **length** of the screen (filter).

  - o The screen (filter) **diameter**, in millimeters.

- A **remark** is used to describe the piezometer, with up to 255 characters.

Figure 23 – Top of PIEZOMETER form – 'Hydraulic' type

13.1. Open tube (hydraulic)

By default, the **Open tube** (hydraulic) button is selected. When another type is selected, it becomes the default type.

- The **length above ground** is entered. It corresponds to the distance between the top of the tube and the natural ground. If a tube is installed below ground, the length will be negative.

- The **tube diameter** is entered, in millimeters.

13.2. Pneumatic

- Enter the **inertia correction** factor.

13.3. Electric (vibrating chord)

- The **linear** equation or **polynomial** equation can be selected with the radio buttons. The linear equation is selected by default.

- The installation **reading R0** is entered (in linear units LU).

- The **temperature** at installation **T0** is entered (in Celsius degrees).

- The **barometric pressure** at installation **B0** is entered (in kPa).

- The **thermic coefficient TC** is entered (in kPa / Celsius degree).

- The **calibration factor CF** is entered (in kPa / LU). This coefficient is used with the linear equation.

- The **A coefficient** is entered (in kPa / LU^2). The value in scientific format can be entered. This coefficient is used with the polynomial equation.

- The **B coefficient** is entered (in kPa / LU). This coefficient is used with the polynomial equation.

- The **C coefficient** (in kPa) is calculated automatically via: $C = -A \times 10^{-6} \times R_0^{\,2} - BR_0$

Figure 24 – Top of PIEZOMETER form – 'Vibrating chord' type

13.4. Seals

The **Seals** button is used to enter the installation materials. The information applies to the current boring, not to a specific piezometer.

- The **top** and **bottom depths** are required. The materials are listed in the table from deepest to shallowest.

  - By default, the bottom of the first material is equal to the total depth of the boring (paragraph 9.1). The bottom of the following materials is equal to the top of the previous. These values can be modified.

- The **code** of the seal has 3 characters maximum and designates the material that will be drawn in the boring log, based on the simplified classification. On the log, the seal is drawn with pattern S_CODE defined in Geotec8.ptn, or several superimposed if 2- or 3-letter codes are used (ex: code SG = code for sand + code for gravel).

- The **material** is automatically added as the code description if it exists in LIST_ENG (paragraph 7.6). It can be modified.

Figure 25 – Bottom of PIEZOMETER form – Seals

13.5. Piezometric levels

The **Levels** button is used to enter the piezometric levels recorded for the current piezometer indicated at the top of the form. The table differs depending on the piezometer type.

- The **measurement date**, in "yyyy-mm-dd hh:mi" format, is selected via the calendar icon. **By default**, the current date and time are entered when creating a new measurement.

- The **reading** is entered. It can be:

  - Open tube (hydraulic): the water depth relative to the top of the tube; the suggested unit is the meter.

  - Pneumatic: the pressure reading, in kPa.

- o   Electric (vibrating chord): the reading on the dial, in LU.

- **T1** is displayed when Electric is selected. It is the **temperature** during the reading.

- **B1** is displayed when Electric is selected. It is the **barometric pressure** during the reading.

- The **pressure** is calculated based on the following equations.

   - o   Open tube: $P = (installation\_depth - length\_aboveground - R_1) \times \sin(dip) \times 9.806$

   - o   Pneumatic: $P = R_1 - inertia$

   - o   Electric:

      - o   Linear equation: $P = CF \times (R_1 - R_0) - TC \times (T_1 - T_0) - (B_1 - B_0)$

      - o   Polynomial equation: $P = A \times 10^{-6} \times R_1^{2} + BR_1 + C - TC \times (T_1 - T_0) - (B_1 - B_0)$

- The piezometric **level** (in meters) is calculated based on the following equation:

  $Level = TN - installation\_depth \times \sin(dip) + P/9.806$

  where TN is the natural ground elevation (Z) defined in the Boring form

- The **remark** is a 2-character code to add an indication about the measurement.

SEALS	**LEVELS**				
Date*		Reading (m)	Pressure (kPa)	Level (m)	Remark
☐ 2021-09-04 17:11	🗓	1.020	5.109	99.180	t(2) ▼
☐ 2021-09-06 11:30	🗓	1.060	4.717	99.140	t(2) ▼
☐ 2021-09-07 13:35	🗓	1.070	4.619	99.130	t(2) ▼ +

Figure 26 – Bottom of PIEZOMETER form – Piezometric levels

14.   PEN TEST form

The PEN TEST form is used to define dynamic penetration tests. It is opened via the list of forms at the top of the main screen or by touching a dynamic penetration column in the log.

- The **depth increment** per measurement can be inputted. A value of 0.3048 m (1 ft) is displayed by default. The increment is used when inserting new rows in the bottom table.

- The **hammer weight** is generally entered in kg.

- The **height of fall** is generally entered, in meters.

In the bottom table, we add the test measurements.

Geotec   **Sobek**

- **Depth** is required; enter the <u>top depth of the measurement</u>, before the blows.

  By default, the 1st depth is 0 m. The following depths are increased by the depth increment or by 0.3048 m (1 ft) if no increment is entered.

- The number of **blows** necessary for the cone to penetrate from the current depth to the following.

- **Remark** contains a string of 255 characters to enter additional information.

Figure 27 – PEN TEST form

15. VANE TEST form

The VANE TEST form is used to define a vane test and the resistance measurements. It is opened via the list of forms at the top of the main screen or by touching a vane column in the log.

- The **test date**, in "yyyy-mm-dd hh:mi" format, is selected via the calendar icon. **By default**, the current date and time are entered when inserting a vane test for the current boring.

- The **apparatus number** is entered, with up to 20 characters.

- The type of **blade** indicates its dimensions, for example; with 40 characters.

- The most recent **calibration date**, in "yyyy-mm-dd hh:mi" format, is selected via the calendar icon.

- The **K calibration coefficient** of the apparatus is entered, with 3 decimals.

- **Remark** contains a string of 255 characters for additional information.

In the bottom table of the form, add the shear strengths for the vane test.

- **Depth** is required; enter the depth of the vane resistance measurement.
- The **maximum shear strength SU** (unremoulded soil) is entered. The suggested unit is the kPa.
- The **residual shear strength SUR** (remolded soil) is entered. The suggested unit is the kPa.
- **Remark** contains a string of 255 characters to add information.

Figure 28 – VANE TEST form

16.   OBSERVATION form

The OBSERVATION form is used to describe any observation done on the field, at a given depth. The tabular form is opened with the Observation icon available in all forms except Site, via the list of forms at the top of the main screen or by touching an observation column in the log.

- The **top depth** is required.

- The **bottom depth** can be entered, if it is an observation done for an interval.

- A **remark** or observation is added with 255 characters.

To **add** a new row, click on + at the bottom of the form.

After modifying a row, click Save.

To **delete** a row, check its box and click on Delete which appears at the bottom of the form.

Figure 29 – OBSERVATION form

17.   ALL TABLES

It is possible to view all the fields of any table of the database, including those that do not have a specific form. To do so, click on ALL TABLES in the list of forms at the top of the main screen or on "View as table" in the options menu in each entry form (paragraph 7.7).

The form can be displayed as a 2-column table (pivot table) where the left column indicates the field name and the right column shows the value. It can also be displayed as a standard table, where each record is a row and each field is a column (whose name is indicated in the header). To switch from one format to the other, use the icons shown on the left.

The scrolling list at the top of the form shows the list of tables (and/or views) of the connected .db3 database. In the options menu of the form, the user can choose to show only the tables and / or the views.

Selecting a table (or view) retrieves all the information in this table for the current site and / or boring. If the table does not apply to a specific site and / or boring, all records are retrieved.

- The data can be modified or completed for the records displayed, except for their key fields.
- If a new record is added, the numbers of the current site and boring are indicated by default.

Figure 30 – ALL TABLES form (pivot table)

Figure 31 – ALL TABLES form (standard table)

17.1. Conditions form for queries

It is possible to do a specific query in the selected table, via the icon shown on the left.

Specify the query criteria in one or several fields of the Conditions form.

The 1st icon at the top of the Conditions form is used to close the form without doing the query. It returns to the More Tables form.

The 2nd icon is used to **retrieve the last query** done in the current table. The query conditions will be filled.

The 3rd icon is used to **execute the query**. The Conditions form will close to return to the More Tables form with the result of the query.

Figure 32 – Query conditions