King Geo Tech SoilTest Reporting System.

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This app is primarily intended to be used by small drill rig operators in the field. It is intended for site soil test data to be entered on site as testing takes place. It includes all site address (street, GPS and LOT/DP), ecological, geographical, wind and slope ratings. It also includes photos as per the requirements of most engineers and includes all soil types as required by the Australian Standards. It includes site and plan photos and also allows drawing of plans in situ. Photographs of soil samples at specific depths are also included. Most of the options are user editable (see below)

Reports are created and stored on the device. If an email address is provided reports are emailed instantly if an internet is available (or queued for sending when internet is available)

Subscription

This soil test reporting app is a monthly subscription. Current cost is $50 AU / month for single license. Bulk licensing for large companies can be arranged, please contact support. The first week is free and the subscription is an “opt in” system.

Updates will automatically install from the App store if your device has auto updates enabled.

Hardware
We recommend this app be used on a larger iPad and suggest a 17” iPad to be the most efficient for use in the field. While it can be used on smaller devices the screen will be very crowded and difficult to use especially in bright sunlight. We also suggest iOS 17 or higher but will work down to iOS 15.

Software
The app King Geo Tech Soil Test Reporting App can be downloaded from the App store as normal. The app will work for free for one week including report generation. After the weeks expiry the subscription will start on a monthly basis. There is no limit to the number of reports you can generate per license.

App Permissions
The app needs access to photos, files, camera and location. Some of these are set on install others will ask for permission on first use.

Reports and Email

If you are going to send the reports by email (recommended!) then you need to set up an email client on the iPad. We recommend the standard Apple suppled email client and we have only tested with a limited number of other email clients.

If you do not have a company email you can use free Gmail account but be aware that Gmail has a 25MB limit for sent emails. With the inclusion of the data and up to 16 photos (4 site photos, 1 plan photo, 3 extra feature photos and up to 8 soil photos) a comprehensive report may exceed the 25MB Gmail (and other free email) size limit.

Note that if you do not have an active internet connection then the email reports will be queued in the Sent folder of your email client and be sent when an internet connection is obtained.

The report will also be stored locally in a folder on the iPad. The naming of work folders is detailed below.

Note: you need to change (or delete) the default email address in the user settings!

User Options
After installation it is recommended that the user open the Settings and configure the options before first use.

The app allows several user options which are accessed through the normal iOS settings menu. These should be set before first use and only changed if absolutely necessary as saved data in one setting may not be compatible with reloaded data with different configurations (see Save/Reload below)

Default options are provided as an example only. Note that some of the options are quite long and not fully visible on the settings menu, we suggest using a plain text editor to format the options as a simple comma separated list and copy/paste into the settings

Number of Bores: this is the number of bore holes per site and is initially set to 2 as most house sites only require 2 bore sites but can be up to 4 bores per site if required by your engineer. If you need more than 4 (i.e. a large industrial site) then we suggest splitting the job into sub sites of 4 with corresponding job IDs.

Bore Depth: this is initially set to 6000mm as this is the deepest most small vehicle mounted drill rigs can go to and should be left at this setting. The app screen will show the full 6000mm but the tables in the report stop when the soil type “END” is selected from the drop down menu.

If screen size is an issue on smaller iPads then this can be reduced to 4500 or 3000 but save/reload data from different configurations may not be compatible (see below)

Soil Types: This is the two basic soil types and also the indicator of the end of the sample depth.

FILL	=	non natural fill
NAT	=	natural undisturbed soil
END	=	end of the test depth

Note: With all the soil identifiers it is assumed that soil is as indicated from the first type until the next type is encountered in the table. e.g.

100mm	FILL	SND/GVL	CL	Pl White
400mm	NAT	CLY/SLT	CH	Grey

indicates that the soil type was FILL/SND/GVL/CL/PlWhite from 100mm to 400mm when it changed to NAT/CLY/SLT/CH/Grey

Soil Description: this is a string of comma separated soil descriptions. The initial setting is set to the types described by the Australian Standard but can be set to any string. Be careful to use a simple text editor and only include letters, spaces and commas. This is somewhat duplicated in the much more detailed Soil Class option but engineers like to have a word description of the soil classes.

In the app more than one type can be selected for any particular depth and the order implies relative content so for example for a silty clay select SLT first then CLY and the option in the table will appear as SLT/CLY

GVL	=	Gravel
SLT	=	Silt
CLY	=	Clay
SND	=	Sand
XROCK	=	XRock
DROCK	=	Drock

If you want to unselect then simply tap the option again and then unselect the option with a tick next to it.

Operators: this is the list of operators for this rig. The operator for this particular job can be selected in the app. As previously this is a simple comma separated string of names.

Moisture Types: This is again a user settable string initialised to the Australian Standard but can be changed to suit your engineer requirements.

W	=	Wet
VM	=	Very Moist
M	=	Moist
D	=	Dry

Soil Colours: a comma separated list of standard colours as per the Australian Standards. They are self explanatory. Again a simple comma separated list of colours which can be edited if required. Some colours have modifiers:

Pl	=	Pale
Mt	=	Mottled

Basic Colours:

Black, Pl Black, White, Pl White, Grey, Pl Grey, Red, Dk Red, Brown, Dk Brown, Orange, Dk Orange, Yellow, Mt Yellow, Purple, Mt Purple, Green, Mt Green, Blue, Mt Blue

Soil Classes: a comma separated list of Australian standard soil types which can be edited if required. The following is a table of the basic soil types for the Australian Standard.

CH, CI, CL, GC, GM, GP, GW, OH, OL, ML, SC, SM, SP, SW, Pt

The table below describes the basic soil types and classification criteria.

Note: Many natural soils will have property characteristics of two groups because they are close to the borderline between the groups, either in ratio of the various sizes or in plasticity characteristics. For these soils, boundary classifications are used i.e. the groups symbols most nearly describing the soil are represented by selecting one class at one depth and the next class at the next depth e.g. a GW->GC transition is indicated by selecting GW at 500mm and GC at 600mm and then when the soil transitions to full GC then GC is selected again. So in the table the soil may show as follows:

100mm	GW
200mm	
300mm	
400mm	GW
500mm	GC
600mm	
700mm	GC

This indicates that the soil was as follows:

100-400mm	pure GW
400-700mm	combination of GW/GC or transition of GW→ GC
700mm+	transitioned to pure GC

Proper boundary classification of a soil near the borderline between coarse-grained and fine-grained soils is accomplished by classifying it first as a coarse-grained soil and then as a fine-grained soil: e.g. transitions such as SM->ML and SC->CL are common

Australian Standard Soil Types

COARSE-GRAINED SOILS **More than half the material (by weight) is individual grains visible to the naked eye**	GRAVELLY SOILS More than half of coarse fraction is larger than 4.75 mm	CLEAN GRAVELS Will not leave a stain on a wet palm	Substantial amounts of all grain particle sizes	GW
			Predominantly one size or range of sizes with some intermediate sizes missing	GP
		DIRTY GRAVELS Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)	GM
			Plastic fines (to identify, see CL below)	GC
	SANDY SOILS More than half of coarse fraction is smaller than 4.75 mm	CLEAN SANDS Will not leave a stain on a wet palm	Wide range in grain size and substantial amounts of all grain particle sizes.	SW
			Predominantly one size or a range of sizes with some intermediate sizes missing	SP
		DIRTY SANDS Will leave a stain on a wet palm	Non-plastic fines (to identify, see ML below)	SM
			Plastic fines (to identify, see CL below)	SC

FINE-GRAINED SOILS **More than half the material (by weight) is individual grains not visible to the naked eye** **(<0.074 mm)**	**Ribbon**	**Liquid Limit**	**Dry Crushing Strength**	**Dilatancy Reaction**	**Toughness**	**Stickiness**	
	None	<50	None to Sight	Rapid	Low	None	ML
	Weak	<50	Medium to High	None to Very Slow	Medium to High	Medium	CL
	Strong	>50	Slight to Medium	Slow to None	Medium	Low	MH
	Very Strong	>50	High to Very High	None	High	Very High	CH
HIGHLY ORGANIC SOILS	Readily identified by colour, odour, spongy feel and frequently by fibrous texture						OL OH Pt

Contractors: a comma separated list of three letter code for which contractors are associated with this job. This code is used in the naming of files and email subjects.

Debugging: this is in case of a crash. If you encounter a crash then set debugging to “2” to save a log file which you can send to support for finding the source of the crash. Normally this is set to 0!

GT Email Home: this is the email address to email the PDF reports to. Note that you need an internet connection to send emails and if the iPad is configured properly emails will be queued in the Sent folder for sending when an internet connection is restored.

This option can be empty (not recommended), a single email or a comma separated list.

Address: This is a 5 line contact address placed at the beginning of the PDF reports. It is simply a 5 line address with each line separated by a comma. A triple tap on the line and then copy/paste to a simple text editor to change and then paste back in will allows customisation of the address.

Company Logo:
In the KingGeoTech/Reports folder you will find a jpeg called logo.jpeg. This is the logo placed at the top of reports and also as a placeholder inside the reports.

You can replace this with your company logo BUT it must conform to the following specifications:

name: logo.jpeg
size: 200x200
colour: sRGB

Save a backup copy of the logo.jpeg file called logo.jpeg.old and copy a new file called logo.jpeg into the same folder

Use of Soil Test Reporting App

When first starting the app asks whether you are staring a new job or editing an old job. Selecting a New Job brings up a job ID entry screen.

JobID: The Job ID is an alpha numeric code relating to the job ID it can be your local ID or the contractors ID but must be unique for each job.

Town: The town/suburb/state/area is also used to identify the job locale

Contractors: The left hand side list is the list of contractors as three letter scronyms, select the one for this job.

Operators: The right hand side is the list of operators and you can select one allocated to this job. This is not used for job identification but is printed in the report.

This information is used to identify the report folder name and report name as follows:

/KingGeoTech/ReportFiles/CON_JOBID_TOWN/
Where:

CON	the three letter acronym for the contractor
JOBID	the job identifer
TOWN	the locale for the job

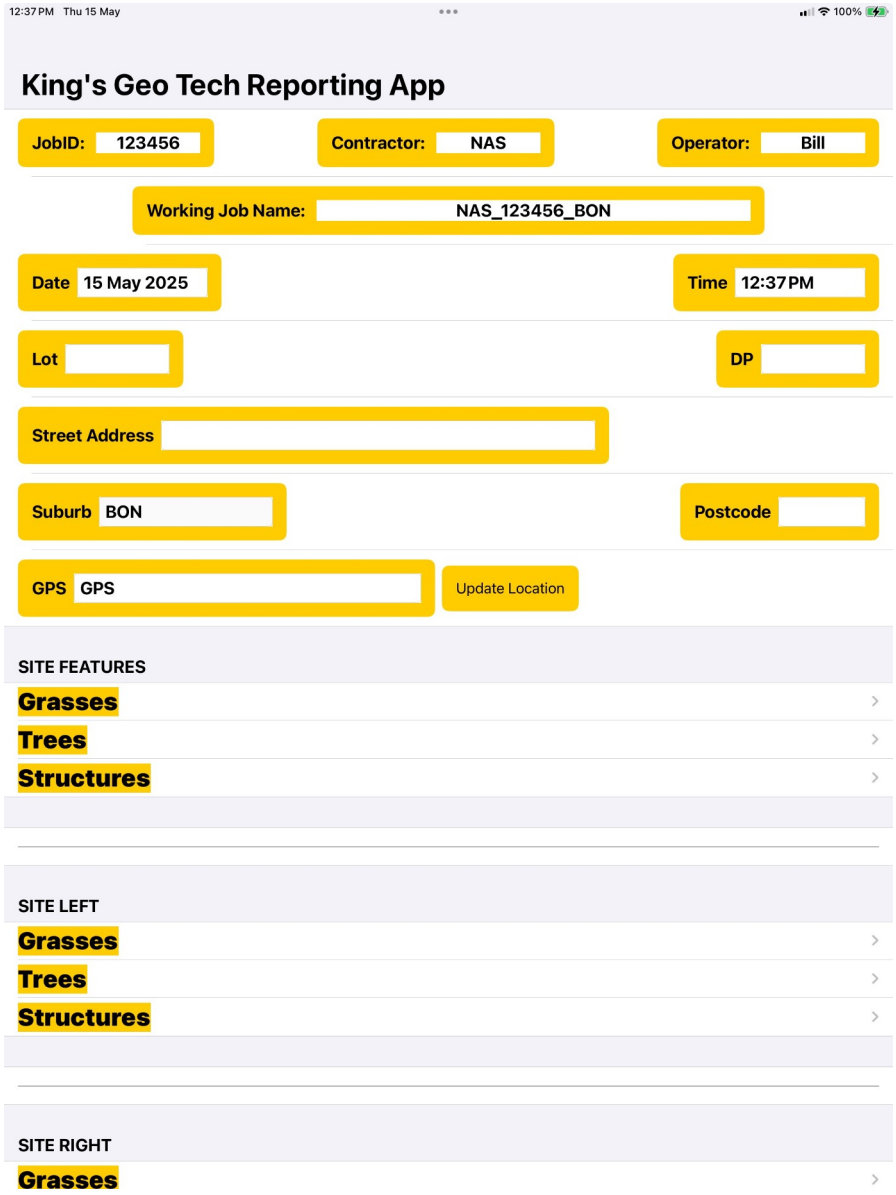
The screen also asks if you have a site plan ready. This can be:

a) photo of a site plan from a developer/engineer
b) hand drawn site plan
c) a pre drawn rough sketch
d) user can draw a simplified one in the app itself

but as this takes some time to prepare we recommend having a site plan ready to go.

Clicking the Submit brings up a confirmation screen to check the details, selecting Confirm will locks in the job details so please check details carefully!

This is the opening screen and the JobID, Contractor, Operator have been pre filled and are not editable. Also the working job file name has also been filled in as have the Date and Time (but they are editable by clicking in the box).



You can fill in the other address details (Lot/DP/Street/PostCode) if required by tapping in the field.

Clicking the GPS will initiate a once off GPS lock but this can be edited if required.

Site Properties
The following 4 sections allow the user to select the types of vegetation and structures on the main site and the 3 surrounding sites (left/right/rear).

Each of the options are multi selectable:

Grasses:	Sparse / Moderate / Dense
Trees:	<5m / 5-10m / >10m
Structures:	House / Shed / Units / Creek / Dam / Garden

Site Conditions:

This section allows the user to select the main topographical properties, these are particular to Australian Standards (can be altered for country specific codes)

Slope Grade:	Very Steep / Steep / Gentle / Very Flat
Pad Type:	Cut Pad / Cut Fill / Fill
Surface Conditions:	Hard / Normal / Firm / Soft/Boggy
Surface Rock Visible:	Yes / No
Site Drainage:	Good / Fair / Poor / Very Poor / Seepage

Wind Rating

This section allows the wind rating to be identified again according to Australian Standards but can be modified for different locales as required.

Region:	A / B
Terrain:	TC3 / TC2.5 / TC 2 / TC1-0
Shielding:	Full / Partial / None
Topographic Rating:	T1 / T2 / T3 / T4 / T5
Overall Wind Rating:	N1-W28 / N2-W33 / N3-W41 / N4-W50 / N5-W60

Site Notes

This is a free form text where you can enter any notes about the site e.g. retaining walls, dams, structures etc

Plan Drawings

This is where you enter the plans of the site and the positions of any site features test bores etc. There are three different ways to do this:

Pick a Photo: this allows the user to pick an existing photo from the iPads gallery. This can be a screen shot from a web app like SIX Maps or a hand drawn plan that has been prepared earlier.

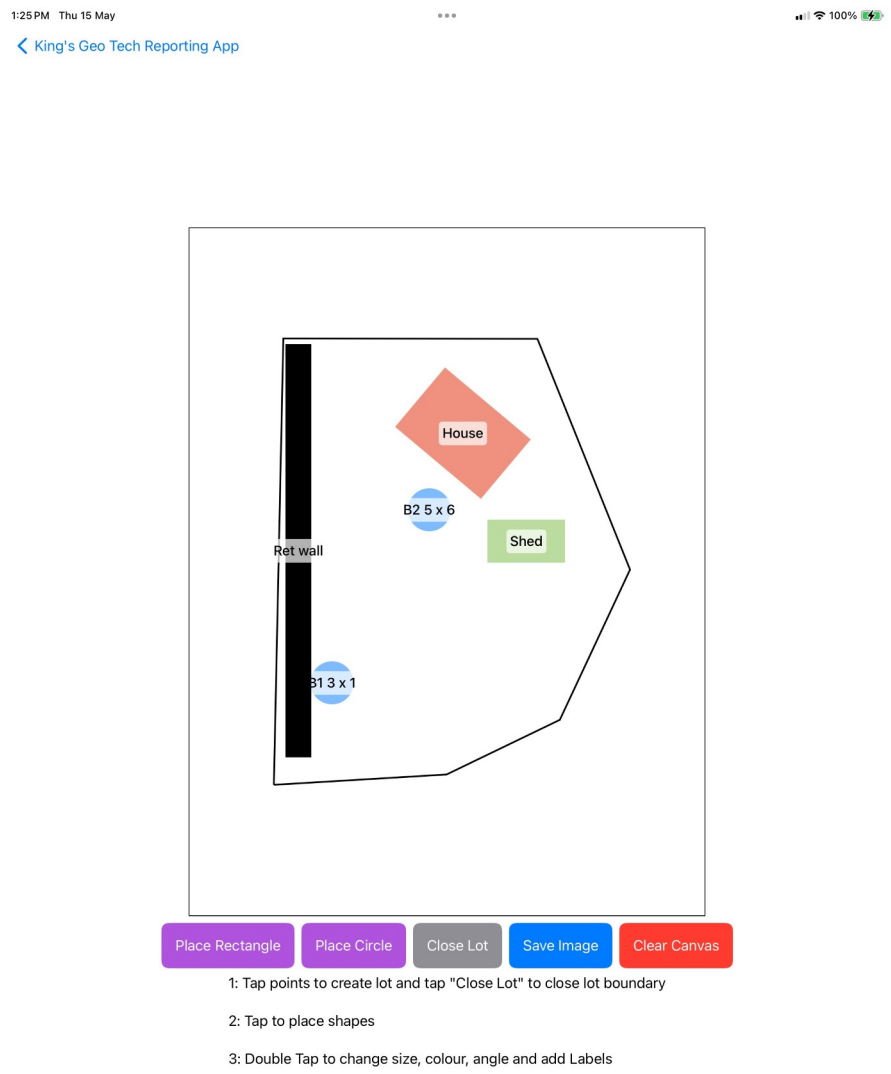
If you don't have a photo in the gallery you can slide the app up and use the camera to take a picture, this will keep a copy of the picture in the iPads gallery and then return to the app to load this photo.

Take a Photo: this takes a photo of a plan you have and keeps it with the apps data but does not keep a copy in the gallery.

Draw a Plan: This brings up a simple drawing package which allows user to draw an outline of the site and draw and place structures in the plan and save that as a jpeg for the report. The drawing package is a very simple package and is mostly self explanatory.

Start by tapping the screen in one corner of the block and then other points in sequence to draw the shape of the site and when finished then select "Close Lot" to create a closed straight line shape representing the lot. Curves are not utilised and if a lot is complicated with lots of curved boundaries it may need to be photographed and/or hand drawn.

Tapping Save Image saves the image, you can then return to the main screen and a small icon of the image will now appear in the Plan section along with a “Delete” option ...



Here we have indicated that B1 is 3m up from the front and 1m in from the left boundary and B2 is 6m from the back boundary and 6m from the right boundary… There is an existing house, shed and retaining wall indicated on the plan

Note: if you have a photo already loaded and then selecting Draw Plan the photo is placed in the background and you can draw over the top of it.

Site Photos

These buttons allow the attachment of 7 photos for the site. The photos are assumed to be taken from the Front looking towards the back of the site (F→B) and Right to Left (R→L) etc. for all 4 views.

Additionally 3 extra photos are available to show site features such as retaining walls, rocks, creeks, dams etc. If these are used the Notes should contain a legend as to what the photos refer to.

Bores

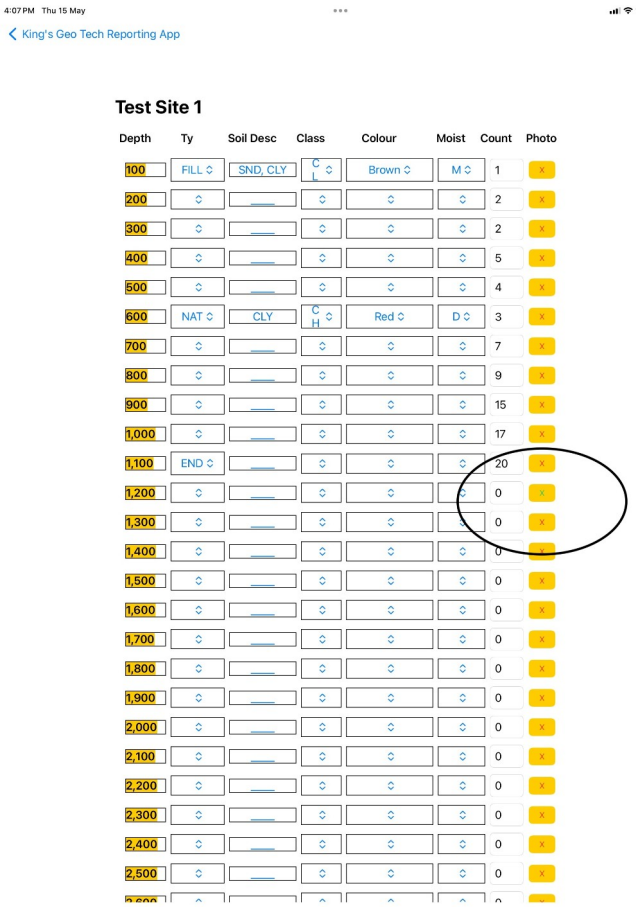
These buttons open up a table of bore data for up to 4 bores. Each of the bores is incremented at 100mm intervals where the soil type, class, description, moisture and colour can be selected. When any of these parameters changes the new value is selected at the depth derived from the drill position. A photo can be taken and attached to the depth so that the change in soil type is not only noted in the table but is also visualised in the report. The presence of a photo at a particular depth is indicated by a green tick in the far right column.

Also the far right column indicates the number of impacts required in the Standard Penetration Test to reach the indicated depth.

The bores are set to 6000mm by default. If you are attempting to use this on a small iPad or an iPhone (not recommended!) then there is no reason to change to other alternatives (4500 or 3000mm).

In the sample below you can see the soil changes from a sand based fill to a natural clay at 600mm and the drill refuses at 1100mm and the SPT also refuses at 20 impacts. Also note that a photograph was taken at the 1100mm mark to show the type of soil at the end of the bore.

You can return to the main screen by tapping the nav bar at the top of the bore data entry screen.



Reports

Finally a PDF report can be generated and emailed to the office by selecting the “Create” PDF report.

The report is created in the work folder and titled: CON_JOBID_TOWN.pdf and contains all tables and photos internally .(not links!)

As the resources of the iPad are maxed out by this app it is better not to view the PDF as it contains large photos etc but if you want to have a preview we recommend installing Adobe Acrobat and view the files outside of the App as they are stored in the job folder.

On a computer the PDF can be converted to other formats and edited if required and we suggest keeping both a digitally signed and cryptogtaphically signed date and time encoded copy of the PDF so as to prevent tampering. Further we suggest even printing a physical copy and also signing it to keep as a reference!

Note: we have HTML and DOCX report templates but these have to be done on a case by case basis. Please contact support if you require different format reports than PDF.

Save Data

You can save all the data for later reload BUT as there are options around how many bores and depths it is advisable to use this with caution.

RELOADING SAVED DATA

The number of bores and the depth are added to the end of the file name in a .bak file named:

CON_JOBID_TOWN_BC_RC.bak

Where BC is the number of bores (2/3/4) and RC is the number of 100mm increments in the file (30/45/60).

So before loading a file ensure that the current number of bores and the depth of bores are set in the settings before starting the app to correspond to the file to be loaded (there is a technical reason with conflict with user settings why this is necessary which may be remedied in the next version so these are changed automatically when a file is reloaded)

Support:

This is the first version and while we have tested thoroughly bugs will almost certainly turn up with diffrerrent users in different situations.

If you have a problem please enable debugging in the User Options and a log file will be created in the Reports folder and send this to us along with your saved file and we will try to fix any issues and issue an update ASAP

Nick and the team at King GeoTech :-)