

Gateway *TerraCutta Pro*

User Manual



TerraCutta Pro User Release Version 2.0
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1: Installation & Licensing

Gateway can be downloaded from on the Precision Cropping Technologies Pty Ltd (PCT); website <http://pct-ag.com/tools/download/>. To install Click the *Install Gateway* link and follow the default install steps.

Note that Gateway requires the .Net 4 framework. Errors in the installation could occur if .Net 4 failed to install. The installation procedure should take the user through .Net4 installation. However, if this does not occur then the .Net 4 framework can be downloaded and installed from the Microsoft website.



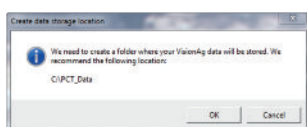
Step 1

After the initial installation has completed, the following procedure will be initiated.
Or double click the Gateway icon on your desktop if the software does not run automatically.



Step 2

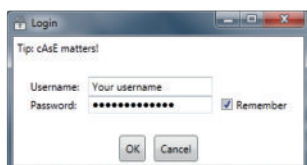
The loading screen will appear as the program opens.



Step 3

Location of data is critical to the smooth operation of the software. By accepting the default settings of the program, a folder named PCT_Data will be created on the users hard drive at the location shown.

Note: The default data directory can be changed at any time by clicking Home>Options and Settings>Set Data Folder.



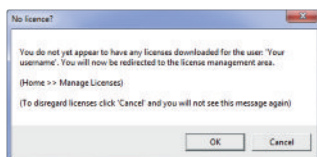
Step 4

A login is required to download licenses and applications (apps). The login and password are provided by a PCT Distributor or Dealer.

Username.....

Password.....

Click *OK* to accept.

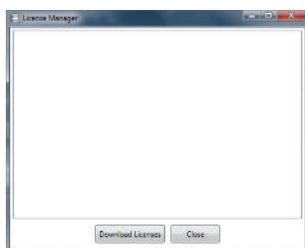


Step 5

After the username and password has been entered and validated the licensing screen will appear.

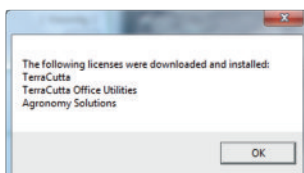
Click *Ok* to move to the *Download Licenses* screen.

Click *Cancel* if you don't have any licenses and just intend to use Gateway for viewing your data.



Step 6

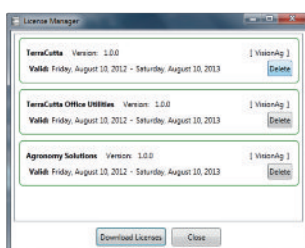
Click *Download Licenses*.



Step 7

This screen will inform the user which licenses have been installed.

Click *Ok*.



Step 8

Finally, the licenses available will be displayed in the License Manager screen.

Click the *Close* button to continue.

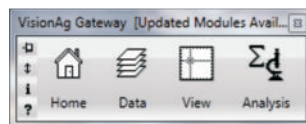


2: Updating & Installing Apps

Unlike existing spatial analysis software Gateway consists of a series of Applications (apps) designed to perform a specific function (or set of functions) and provide a complete data analysis solution. The apps are grouped into four categories:

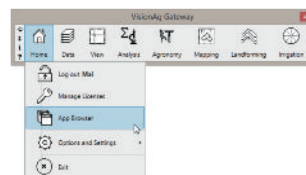
1. Analysis
2. Agronomy
3. Landforming
4. Irrigation

Each app is discussed in greater depth further in the relevant sections of the manual. Follow these steps to install the apps.



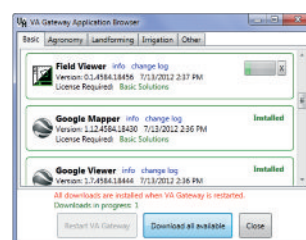
Step 1

When Gateway displays the message ([*Updated Modules Available*]) at the top of the software window; there have been software updates loaded to the program server. If you are installing the software for the first time, this message will be appear as there are apps available for download.



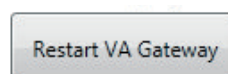
Step 2

Select the *Home>App Browser* to open the Apps Download screen.



Step 3

Clicking the *Download All* button will initiate the download of all available Apps. A progress bar is displayed for each app and the total number of downloads is shown at the bottom of the window.



Step 4

Once the downloads have completed the *Restart VA Gateway* button will become active (no longer grayed out). By restarting Gateway the installation of the apps will begin and the program will automatically restart.

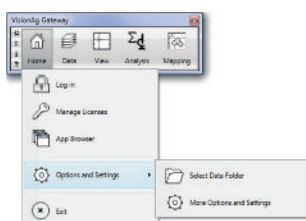


2.1: Options & Settings

Before using the Gateway software, there are several settings which should be customised to suit users operations.

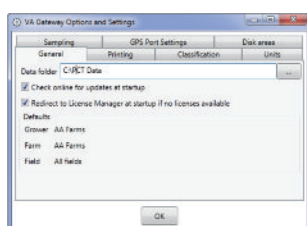
These settings include the location of data storage folder, print operations, classification methods, units of measure, sampling options and GPS settings.

If no changes are made to these settings, factory default settings will be applied.



Step 1

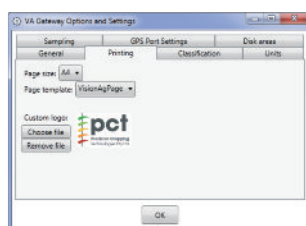
To change the default settings, select *Home>Options and Settings>More Options and Settings*.



Step 2

The *General* tab is used to set;

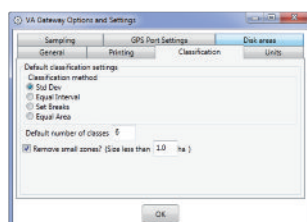
- Location of the Data Folder (this must be one folder above the grower names).
- App updates and licence manager redirection - the default settings alert the user that app updates are available for download and the license manager will automatically appear if licences have expired.



Step 3

Select the *Printing* tab to choose a print template and add a logo to any printed material.

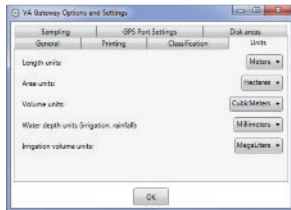
A footer file can also be added if desired.



Step 4

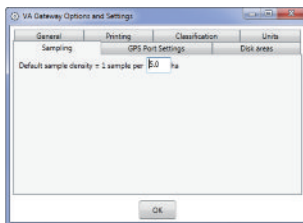
Select the *Classification* tab to set the classification method to zone data for apps such as *Pro Rx*. The default zoning method uses Standard deviation (Std Dev) however an experienced user may prefer another option.

The minimum zone area can also be set (on this tab) to remove zones which are smaller than application machinery can accommodate.



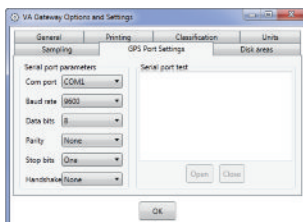
Step 5

The *Units* tab allows the user to set the appropriate units for their system.



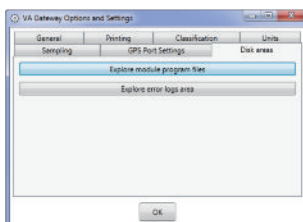
Step 6

The *Sampling* tab allows the sample density to be adjusted. This changes the suggested number of sample points automatically generated in apps such as *Sample Test Rx*.



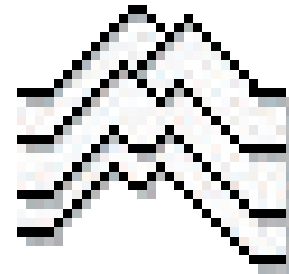
Step 7

Field Viewer and *TerraCutta* are field mapping apps which require a GPS connection. The connection can be tested and set in the *GPS and Port Settings* tab.



Step 8

The *Disk areas* tab exists for support purposes and should have the default settings maintained.



TerraCutta Pro

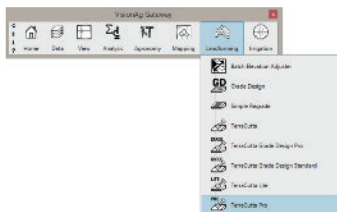
*Incorporating;
TerraCutta
TerraCutta Lite
TerraCutta Pro*





3: TerraCutta Pro

TerraCutta Pro is PCT's proprietary landforming software package that is designed to enhance the capability and efficiency of John Deere's iGrade™. *TerraCutta Pro* enables the user to collect and process terrain (elevation) data, then design appropriate landforming solutions. The program creates output maps and connects to John Deere iGrade™, streamlining and modernizing agricultural landforming operations.



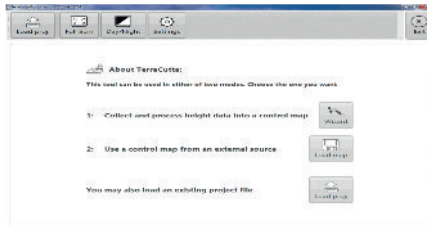
Click on the *Landforming* tab and select *TerraCutta Pro* from the menu.

3.1 Control maps

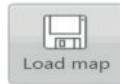
TerraCutta Pro requires a control map as a basis for all landforming designs. Users have three options for using elevation points to create a control map;

1. Use a pre-created surfaced elevation layer from an external source (e.g. OptiSurface™ design file)
2. Load an existing project file (.pcti or .tci), or
3. Collect and process elevation points into a control map using the *TerraCutta Pro* wizard.

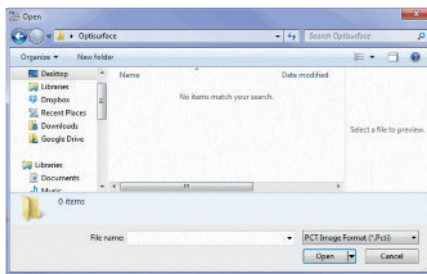




3.2 Load an existing control map (collected and processed points)

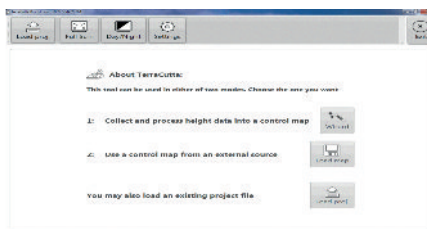


If a control map from OptiSurface™ exists, press the *Load map* button.

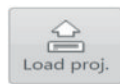


Then from the drop down tab (above the open and cancel button in the bottom right corner of the window) change the format from PCT Image (.pcti) format to OptiSurface™ Design file to search for relevant existing file types.

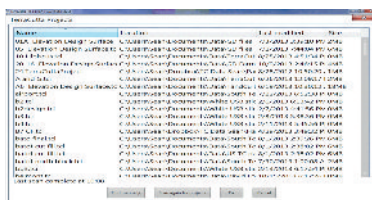
Proceed to chapter 4.0



3.3 Load an existing TerraCutta project



Press *Load proj.* button to load an existing *TerraCutta* project file (.tci). This includes projects exported from *Grade Design*.



Find manually

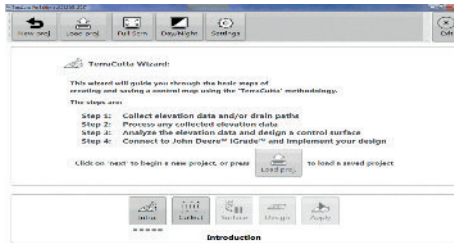
A new window will open which lists all existing *TerraCutta* projects.

Press the the *Find manually* button to search for files in a known location.

Scan again for projects

Press the *Scan again for projects* button to scan the C drive for files.

Proceed to Chapter 4.0



3.4 Collecting elevation points using the TerraCutta Pro wizard

If no control map exists, users can collect elevation points and create a control map in *TerraCutta Pro* using the wizard. The wizard will guide the user through:

1. Collecting the elevation data
2. Processing the elevation data
3. Analyzing the data and designing a control surface map (Chapter 4.0).
4. Connecting to John Deere iGrade™ to implement the design (Chapter 6.0).

The wizard will outline the steps and highlight the completed tasks in green.



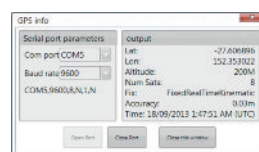
On the wizard main menu; press the *Collect* button to begin collecting elevation data for a field or drain.

Tip: it is recommended that users also map the boundary as part of the data collection process.

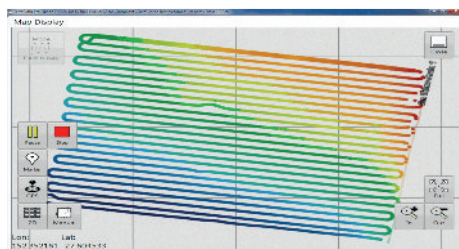


TerraCutta Pro requires a GPS connection. This can be sourced from John Deere iGrade™ by pressing the *GPS* toggle button.

The *GPS info* window will open and the output parameters will populate when a connection is established.



Click *Close this window*.



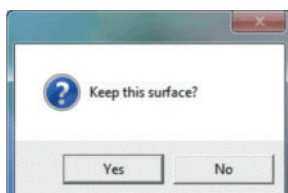
Press the *Start* button to begin collecting elevation data for a field or drain.



The collection process should be paused if the tractor becomes stationary, by pressing the *Pause* button. This avoids collecting multiple points for a single location.

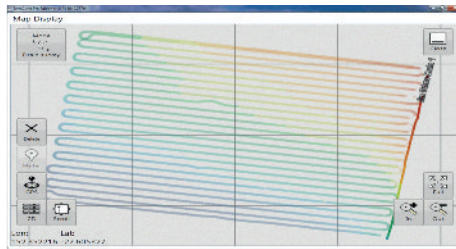


When data collection is complete, press the *Stop* button



Press the *Close* button to exit the mapping window.

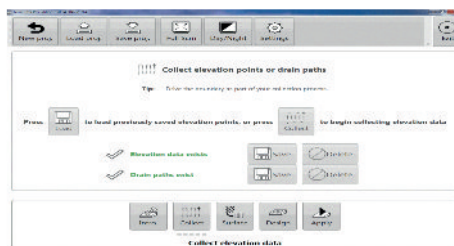
The *Keep this design surface?* window will open. Press *Yes*.



TerraCutta Pro uses slightly different internal parameters to collect data for drain and field surveys.

Toggle between *Field survey* and *Drain survey* modes by pressing the *Survey mode* button.

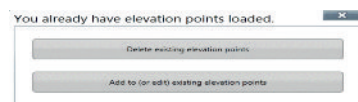
Note: The background control map is transparent when the drain survey mode is active.



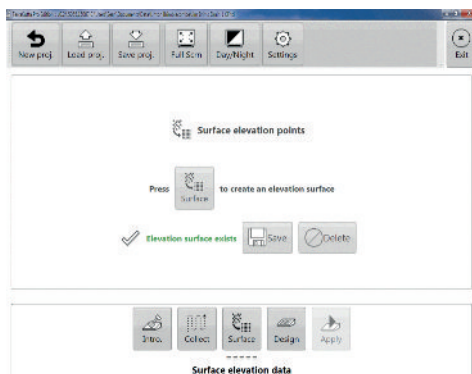
When data collection is complete, press the *Save* button to save the elevation data as a (.pctxyz) file.



Then press the *Close* button to exit the collection screen and return to the wizard main menu.



If an incomplete .pctxyz file already exists, the above step can be skipped by pressing the *Load* button. A new window will open prompting the user to;
Choose to delete the existing elevation points,
Or
Add to or edit the existing elevation points.

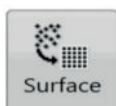
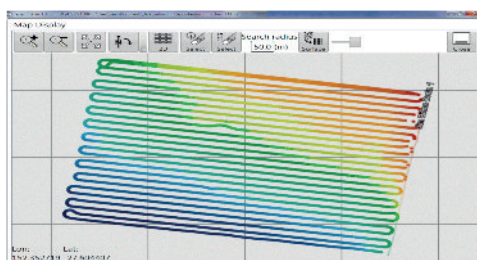


4.0 Surface elevation points to create a control map



The raw elevation points of a control map require surfacing to create a clean, workable map to be used for future field designs. The surface tool uses an interpolation method to create a surfaced map. Drain survey points do not require surfacing.

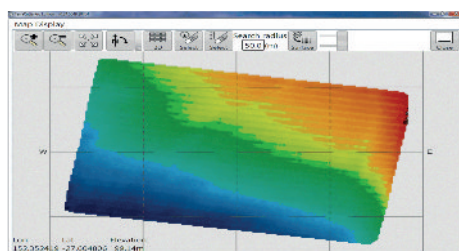
The *Surface* button will open the *Surface elevation data* window.



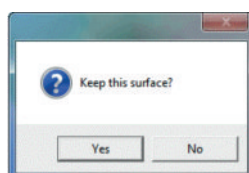
Press the *Surface* button to surface the elevation data.



Tip: If there are gaps in the surfaced map, increase the search radius by pressing and dragging the slider bar and resurface the map by pressing the *Surface* button again.



Once the elevation data has been surfaced press the *Close* button in the top right corner of the window to return to the wizard main menu.



The *Keep this design surface?* window will open. Press Yes.

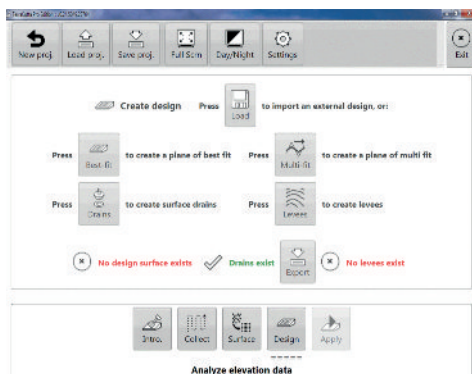


Projects can be stopped and saved as a project (.tci) file at any time by pressing the *Save proj.* button.



To re-open and continue working on an existing project; press the *Load proj.* button and browse to the location of the file.





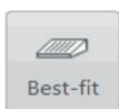
5.0 Designing a Landforming application



A surfaced control map is used as a base map to design a new landforming application map. *TerraCutta Pro* allows users to design a variety of landforming applications maps including;

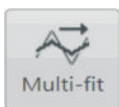
- Levees
- Drains or
- Single, dual or multi plane of best fit for fields

To begin designing press the design button at the bottom of the wizard.



The best-fit calculation optimises the height and slope of a design plane to minimize the amount of dirt that has to be moved to achieve a plane of best fit.

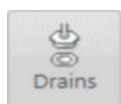
To create a simple plane of best fit for the entire field, press the *Best-fit* button.



Multi-fit builds multiple smaller planes that follow the contours of the ground to drain water in a single direction, usually in the direction of irrigation and or wheel tracks.

The minimum and maximum slope influence the individual plane design which will improve the drainage on a field.

To create a more complex advanced multi-fit design for the field, press the *Multi-fit* button.



To design a field drain, press the *Drains* button.

- Linear drains are formed by designing a straight line or a grade between areas where water is likely to pool and where water should drain from the field.
- Multi-fit drains achieve the same outcome as linear drains however a non-linear line is designed. The line is calculated so the least amount of soil is moved from the field yet ensuring water drains from the field.



To design a field based Levee, press the *Levees* button.

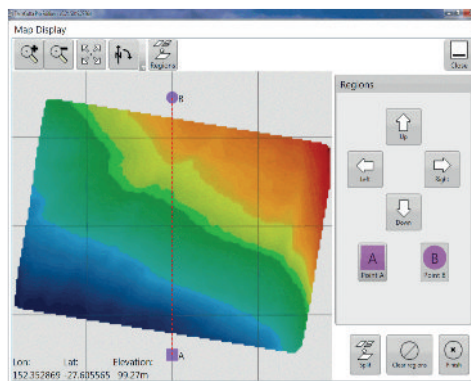
The levee mode can be used to create single or a series of levees at a specific elevation. Designs can be made on either the original elevation surface or design surface.



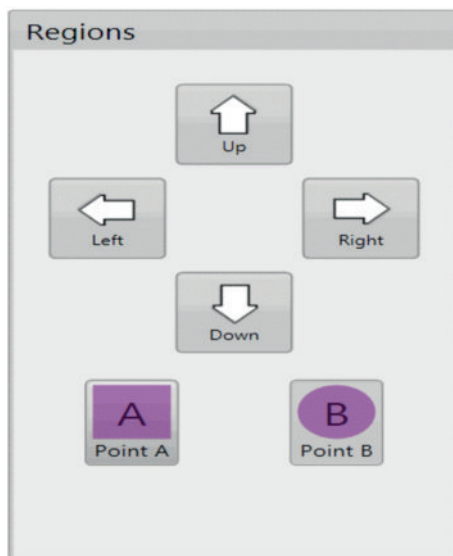
5.1 Creating field regions to define design areas

Often only a section of a field may benefit from a landforming operation. Alternatively, the field may benefit from applying multiple designs. The *Regions* tool (within the Wizard) allows the user to split the field into (up to 5) working regions for different landforming designs.

A Best OR Multi-plane fit is applied to the entire field. Users can only change the primary and secondary slope directions in the different regions within the design. Users can not apply both a best-fit and multi-fit design within the same project.



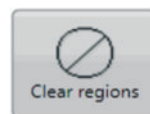
Press the *Regions* button above the main map viewer.



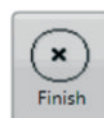
A region is defined by moving Point A and Point B of the 'split' line. Pressing the up, down, left or right arrow button will orientate Point A or Point B to the desired location.



Press the *Split* button to confirm the field 'split'.



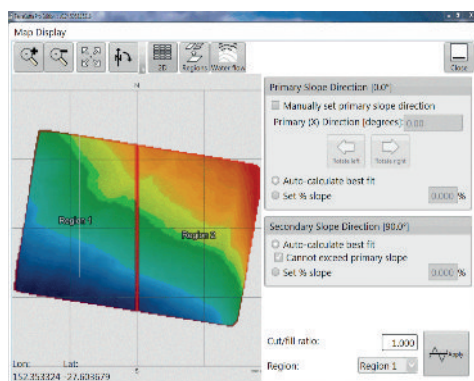
The *Clear regions* button will clear the split line and allow the user to start again.



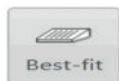
Press *Finish* to finalize the regions.



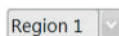
Press the *Close* button in the top right corner of the window to return to the wizard main menu window.



5.2 Best-fit Field Design

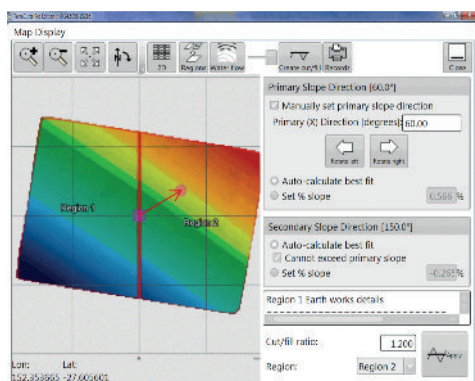


On the main wizard menu press the *Best-fit* button to create a single plane of best fit for a field.



Use the *Region* drop down menu to apply your design to each region.

TerraCutta Pro will auto calculate optimized settings for a plane of best fit. However, users with a good understanding of Laser Plane systems may wish to manually set primary and secondary slopes. Check the box (by pressing) to *Manually set* primary slope direction.

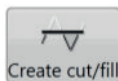
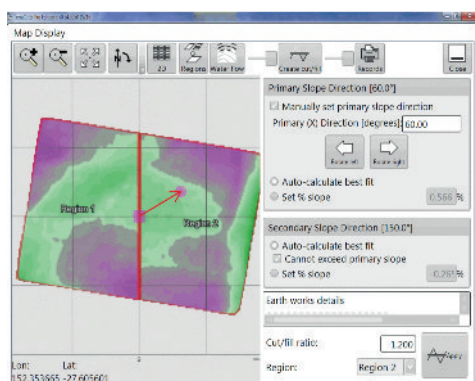


Press the *Apply* button (bottom right corner) to apply the design for each region.



The slide bar will increase the transparency of the design surface over the original elevation surface.

If multiple regions exist; repeat these steps for each region.



If no other design additions (Levee or drain) are required, a cut and fill application map can now be created using the design.



Press the *Create cut/fill* button.

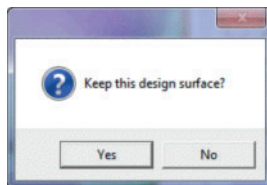
The slide bar (right of the button) will increase the transparency of the cut and fill map over the original elevation surface.

If required, enter a cut/fill ratio.



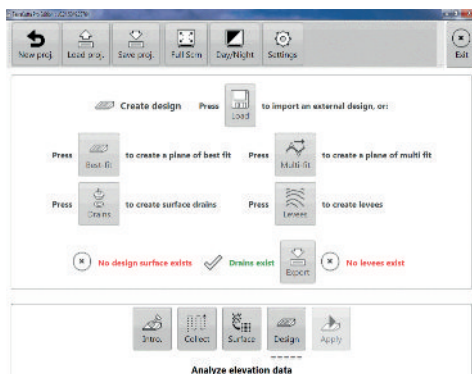
Press the *Close* button to save the cut and fill map using a plane of best- fit design.

The file is saved as a *TerraCutta* project (.tci).

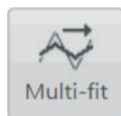


The *Keep this design surface?* window will open.
Press *Yes*.





5.3 Multi-fit Field Design

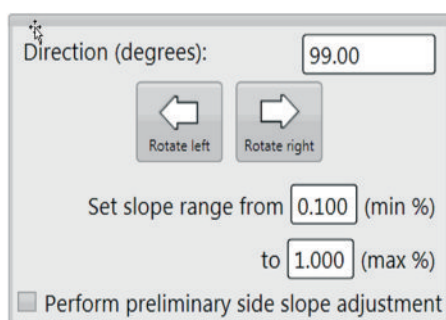


On the main wizard menu press the *Multi-fit* button to create a plane of multi-fit for a field.

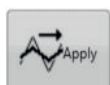
Note: Only users with a good understanding of Laser Plane systems should use this option.



Use the *Region* drop down menu to apply your design to each region.



1. Manually enter the *Direction (degrees)*,
Or
2. Press on the end of the arrow in the map window and drag the arrow to outline the correct direction.
3. Set the minimum and maximum slope range.
4. A preliminary side slope adjustment can be made by checking the box.
5. Enter a cut/fill ratio if required.

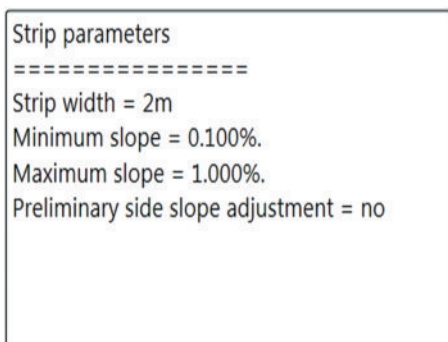


Press the *Apply* button (bottom right corner) to apply the design for each region.

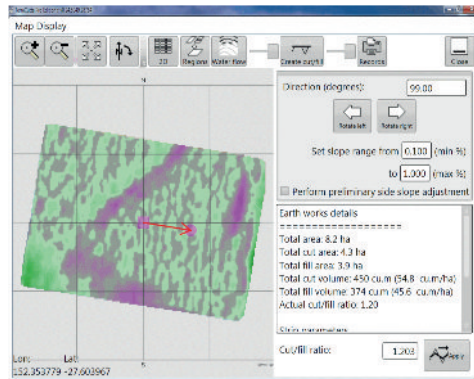


The slide bar will increase the transparency of the design surface over the original elevation surface.

If multiple regions exist; repeat these steps for each region.

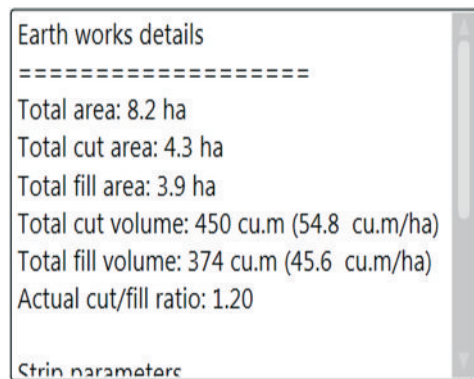


The details of the strip parameters are outlined in the bottom right window.



Press the *Create cut/fill* button.

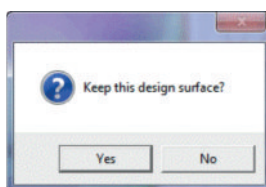
A cut and fill application map using a multi-fit design is created and saved as a *TerraCutta* project (.tci).



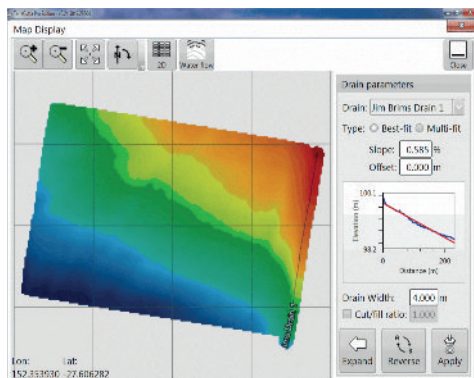
The details of the proposed earthworks are displayed in the bottom right box.



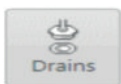
Press the *Close* button to save the cut and fill map using a multi-fit design. The file is saved as a *TerraCutta* project (.tci).



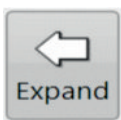
The *Keep this design surface?* window will open. Press *Yes*.



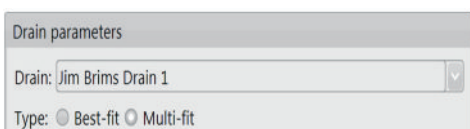
5.4 Drain Design



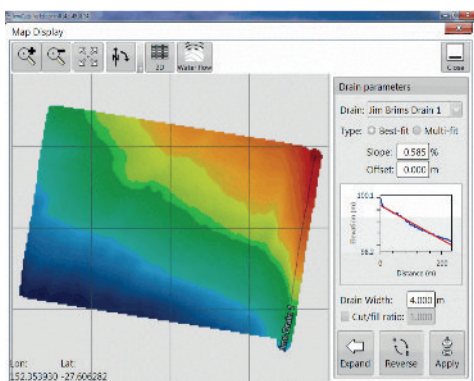
On the main wizard menu press the *Drains* button to create your drain design.



The drain parameters window can be increased by pressing the *Expand* button (bottom right).



Field drains can be designed using a plane of Best-Fit or a Multi-fit design.
Choose the option appropriate to the outcome.

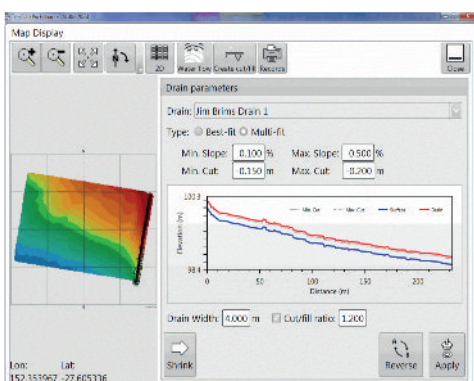


5.4.1 Best-fit Drain Design

Choose the *Best-fit* type.

Manually enter the slope and offset.
A negative number in the offset box will create a drain or a positive number will create a road.

If required, enter a cut/fill ratio



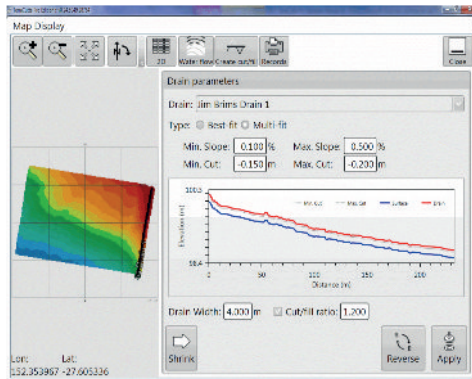
5.4.2 Multi-fit Drain Design

Choose the *Multi-fit* type.

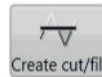
Manually enter the minimum and maximum slope.
Set the minimum and maximum cut for drain depth.
A negative number in the offset box will create a drain or a positive number will create a road.
Enter the width of the drain.

If required, enter a cut/fill ratio.

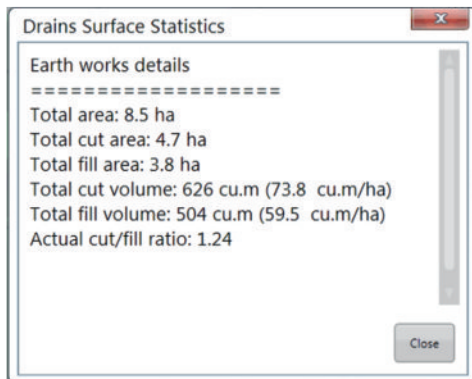
Note: In situations where surface designs contain both field and drain designs a cut/fill ratio will balance the soil removal. I.e. the soil removed from the site of the drain will be transferred to the field.



Press *Apply*.
A new window will open showing the *Drains Surface Statistics*.



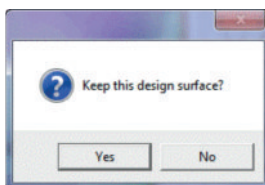
Press the *Create cut/fill* button.



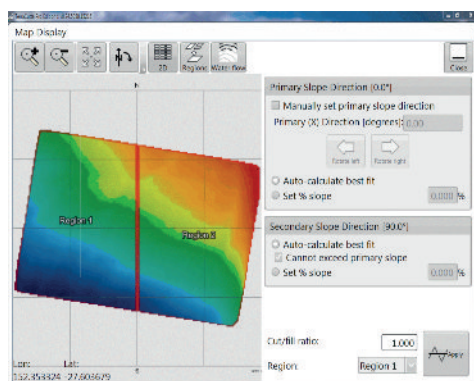
A new window will open showing the *Drains Surface Statistics*.



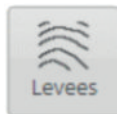
Press the *Close* button to save the cut and fill map for drain design.
The file is saved as a TerraCutta project (.tci).



The *Keep this design surface?* window will open.
Press *Yes*.



5.5 Design a Levee

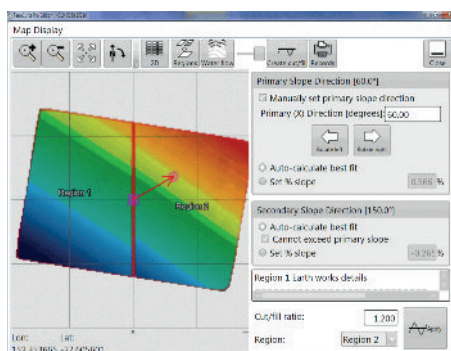


On the wizard main menu press the *Levees* button to add Levee/s to the original elevation or a design layer.

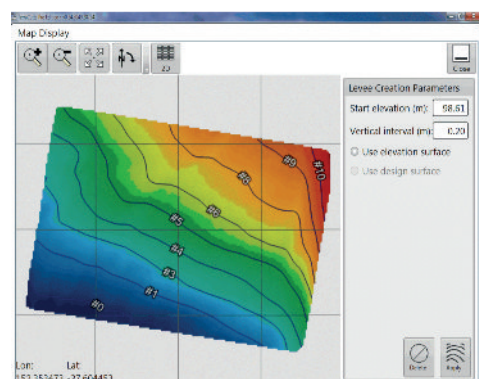
TerraCutta Pro will design the levee/s based on the *elevation surface*. However, a Levee design can be based on the *Design Surface* by checking the *Use design surface* button.

Enter the parameters for the levee;

- Starting elevation (the height the first levee will be placed).
- Vertical interval (distance between levees).



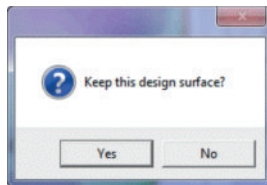
Press the *Apply* button to view the levee placement.



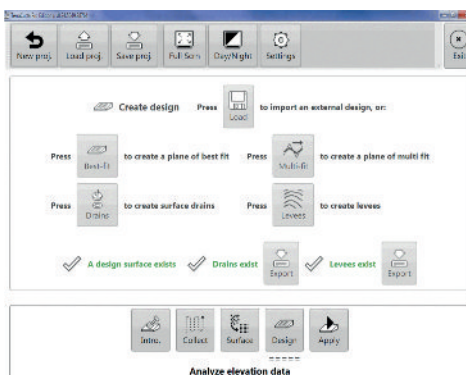
The levees are displayed on the map and are identified by consecutive numbers down the slope of the field.



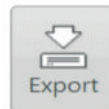
Press the *Close* button to save the levee design.
The file is saved as a *TerraCutta* project (.tci).



The *Keep this design surface?* window will open.
Press *Yes*.

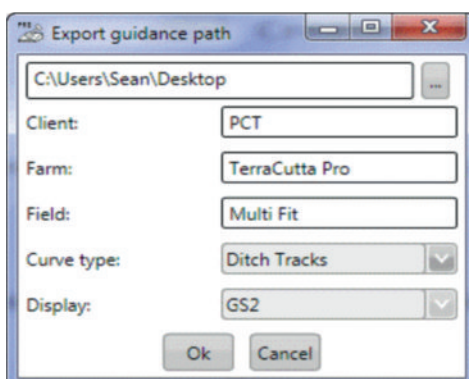


5.5.1 Exporting Drain and Levee designs as John Deere Guidance lines



Created drains or levees can be exported to a GreenStar Display as either a GS2 (2600) or a GS3 (2630) as Greenstar ready guidance lines. On the wizard main menu; press the *Export* button.

Note: When both drain and levee designs exist, each design is required to be exported separately.



Press the *Browse* button and select the location of a GS2/GS3 compatible removable storage device to save the new RCD folder.
Enter the *Client*, *Farm* and *Field*.

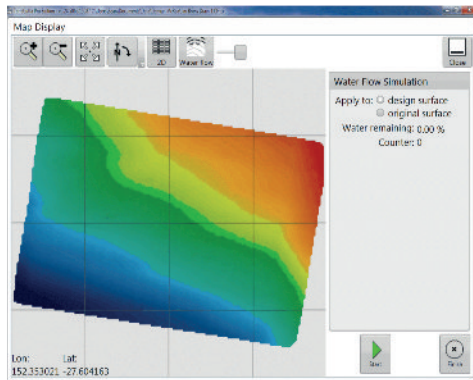


Select the *Curve type* used to import the file.

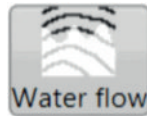
Note: Select:
Ditch Track for Drains,
Levee Track for Levees.

Choose the *Display* type.

Press Ok.



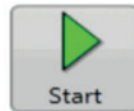
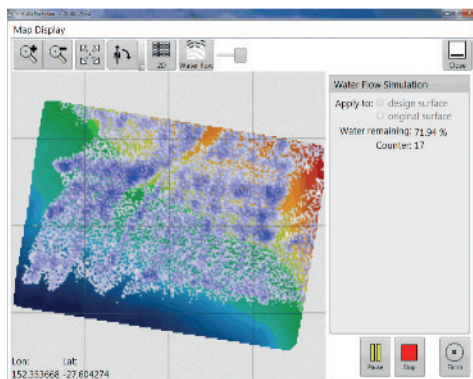
5.6 Design check, using the Water Flow Simulation



A water flow simulation can be activated for any original or design surface created in *TerraCutta Pro*.

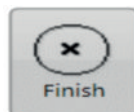
The tool visually models the flow of water over a flat fallowed surface highlighting infiltration and movement of water.

In any of the active design windows, press the *Water flow* button to simulate water flow for the active design.



Apply the simulation to either the *Original surface* or *Design Surface* by pressing the circle. Press the *Start* button to activate the water flow simulation.

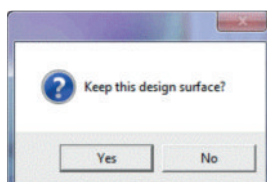
The percentage of *Water remaining* and *Counter* will display the progress of the simulation.



Press the *Finish* button to exit the Water flow simulation screen.



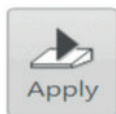
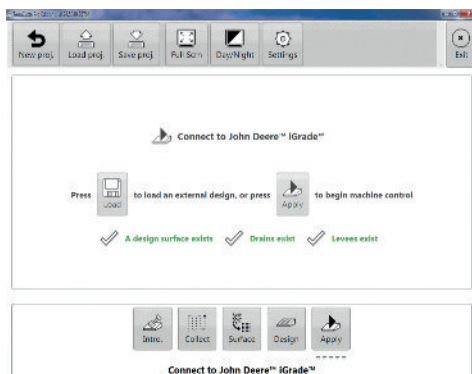
Press the *Close* button to exit the mapping window.



The *Keep this design surface?* window will open. Press *Yes*.

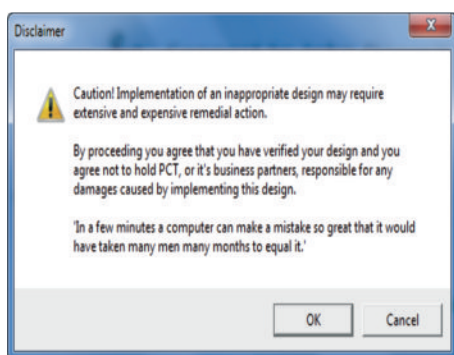


6.0 Applying design surfaces using John Deere iGrade™



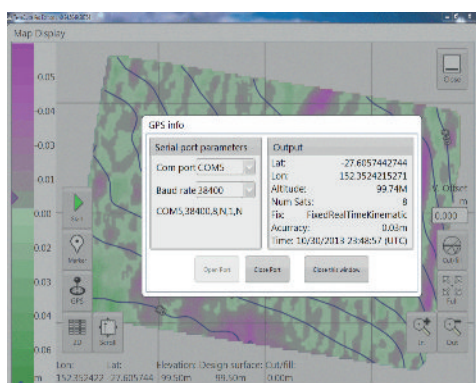
In the main wizard menu, press the *Apply* button.

Then press the *Apply* button in the centre of the screen.



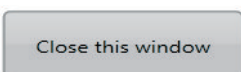
A new *Disclaimer* window will appear. The user acknowledges understanding of and agrees to the disclaimer by clicking *Ok*.

This will also initiate a connection between *TerraCutta Pro* and John Deere iGrade™.

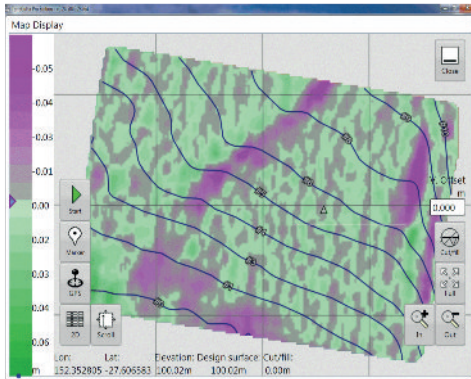


The GPS info window will open. If the GPS is functioning correctly the output parameters will be populated.

If the output parameters are not populated, the GPS is most likely not functioning correctly. Refer to the GS2/GS3 User Manual for troubleshooting.



Press *Close this window*.



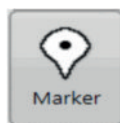
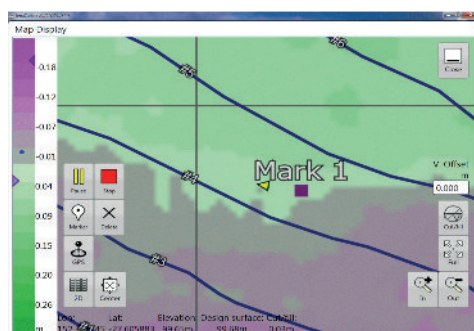
Press the *Start* button to send *TerraCutta Pro* design surface/s (command output) to John Deere iGrade™.

Note: If the start button is not visible on the screen. Check the GPS connection.





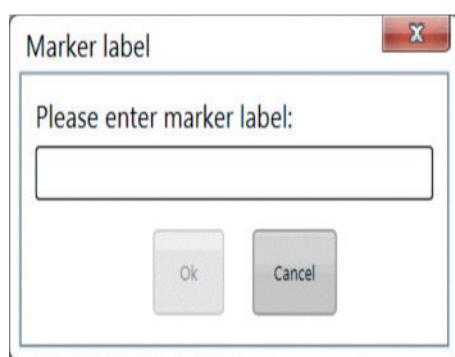
6.1 Additional tools for applying design surfaces.



6.1.1 Marker Points

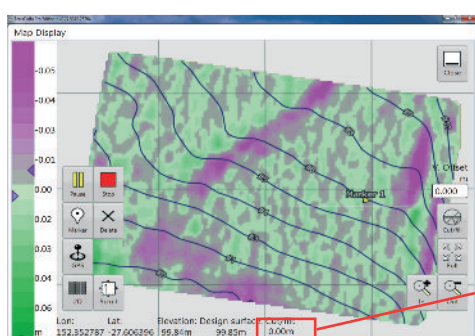
The Marker button can be used to create a point mark on the map screen.

Press the *Marker* icon and then press on the correct position on the map within the window.



The *Marker label* naming window will open.

Enter a name for the marker and press *Ok*.



6.1.2 Setting the benchmark drive

To set a benchmark drive; navigate to a wheel track and location within the field (that the data was collected on) where the Cut/fill value is "0.00m" as indicated on the screen.

Place the cutting edge of the bucket on the ground and 'zero' the *TerraCutta Pro* system by pressing the *Set Offset – Zero Error* button on the John Deere iGrade™ interface screen.

Remote Control Main	
Status	No GPS
Control Error (ft)	0.00
Offset (ft)	0.03
Command (ft)	0.00
Set Offset - Zero Error	
Shift Offset Up	
Shift Offset Down	