



# Geospatial PDF

quick start guide



A geospatial PDF is a special version of Adobe's Portable Document Format that relates a region on a map to its real-world coordinates via georeferencing. Geospatial PDFs allow users to view and manipulate geographic data and maps using nothing more than Adobe Reader.

Geospatial PDFs requires Adobe Reader 9 (or later). You can download the latest version of Adobe Reader at <http://get.adobe.com/reader/>.

All maps are provided as multi-layered geospatial PDF files.

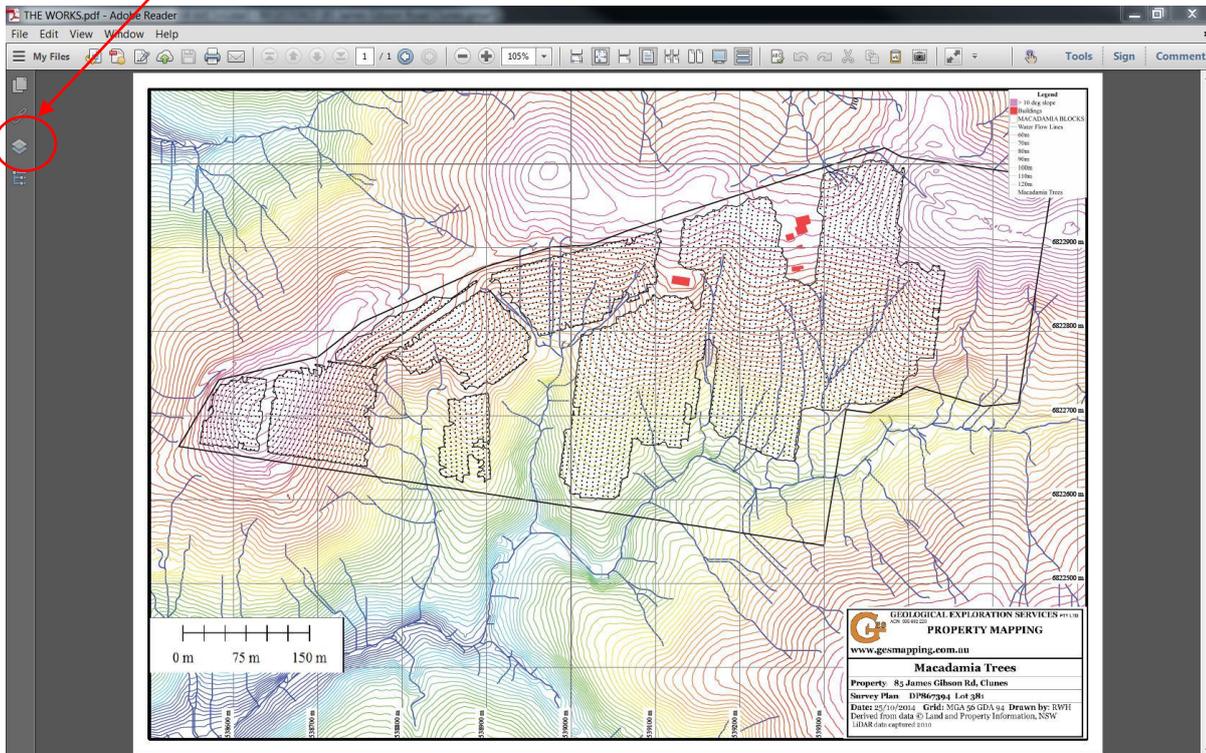
The specific file *address\_THE WORKS.pdf* is a multi-layered file that has raster layers of:-

- Slope, Aspect, Density, Canopy HAG, Air photo, Digital Elevation Model and, DP Plan and vector layers of
- > 10 deg slope, Water Flow Lines, 1m Elevation Contours, Macadamia Trees, Macadamia Blocks and Property Boundary

The advantage with this file is that any combination of raster with multiple vector layers can be used to compile a map for printing. The disadvantage is that there is only a single legend (usually DEM) for the raster layers. When first opened the default is to open all layers. The initial view is therefore a bit messy until some of the layers are turned off.

Further details of the content of each layer is discussed below.

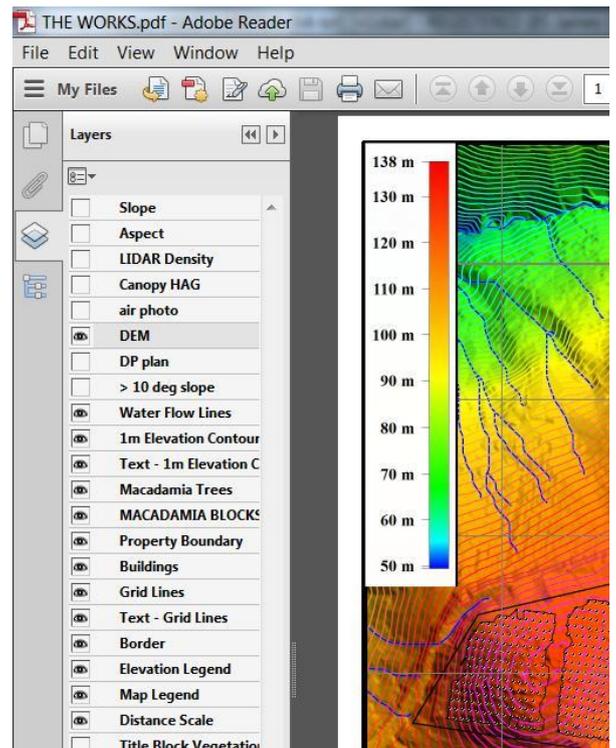
Layers



If Layers panel is not visible, press F4 or click on View / Show/Hide / Navigation Panes / Layers

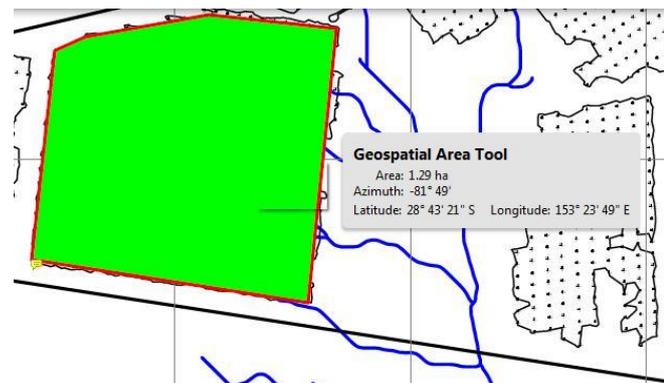
## Toggling layers on and off

1. Click on the Layers navigation panel icon to expand the panel.
2. Layers can be toggled on and off by clicking the eye icon next to each layer name.
3. The Layers are ordered in the navigation panel in the same order they are “printed” on a map with raster layers plotting first overlain with vector layers.
4. A selection of Title Blocks is included at the bottom of the navigation panel to allow the user to select the appropriate Title by toggling the others off.



## Measuring distance, perimeter, and area

1. Click on the Measuring Tool from the Edit / Analysis toolbar.
2. Choose a Snap Type (optional)
3. Choose a Measurement Type:
  - Geospatial distance tool (linear)
  - Perimeter tool
    - Area tool
4. To measure distance:
  - Click anywhere in the map to start measuring.
  - Click anywhere else to finish.
5. To measure perimeter:
  - Click anywhere in the map to start measuring.
  - Click anywhere else to add a vertex.
  - Double click anywhere else to finish.
6. To measure area:
  - Click anywhere in the map to start measuring.
  - Click again to add a vertex.
  - After you have clicked at least two points, click the first point to finish.
7. To change measurement units:
  - Select Edit / Preferences / Measuring (Geo) to change units to:-
    - Display latitude and longitude as WGS 1984 (same as GPS units)
    - Default distance units (meters)
    - Default area unit (hectares)

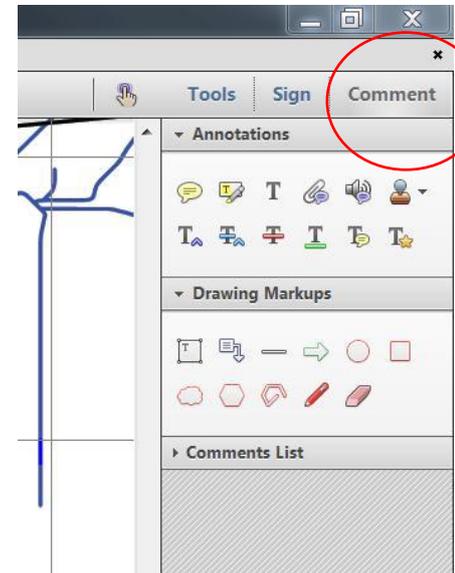


## Finding geographic coordinates

1. Click on the Geospatial Location tool from the Edit / Analysis toolbar.
2. Move the mouse over any area of the map and the geographic coordinates will be displayed at the bottom right of the Adobe Reader screen. The MGA is displayed as Grid Lines layer (100m spaced) with coordinates on the bottom and right hand side of the map.
3. Right click to mark or find a specific location.

## Adding comments and Markups

1. Click on the Comment toolbar (or select View / Comment / Annotations).
2. Select the appropriate tool to add text or draw lines, shapes or areas on the map.



## Layer Details

**DP Plan** - The Deposited Plan defines the legal boundary of the land. It is used to provide an accurate property boundary. Where survey marks are available they have been used to tie the boundary to the MGA.

**Digital Elevation Model (DEM)** - The strength of LIDAR is its ability to provide accurate elevation data over large areas unsurpassed by any other technique. This data can be used to construct Digital Elevation Models and elevation contours. The DEM is a 3D representation of the terrain's surface as a digital model. Engineering quality contours can be generated from 20cm intervals. Elevation of the land is closely related to soil moisture.

**Slope** – for each point in the DEM the slope is calculated as the steepest decent or ascent (gradient) at that point. The slope map defines areas of equal gradient. The slope gradient has significant impacts on land-use due to amount and rate of water run-off affecting soil loss and water storage. The depth of soil is often related to the slope which defines the site as erosional or depositional.

**Aspect**- for each point in the DEM the aspect is calculated as the downhill direction of the steepest slope. The aspect map colours each point depending on the orientation to which a slope faces. The aspect can have a strong influence on soil temperature and can have a significant impact on the farm scale micro-climate.

**Water Catchment area** – defined as the total area flowing to a given point bounded by a drainage divide. Noting the drainage boundary divides in relation to the macadamia block boundaries provides a visual estimate of the amount of water flowing into a macadamia block. This can be used to assist with drainage management.

**Flow Accumulation** – derived from the DEM using an 8 direction pour point model and determining the flow accumulation for each cell by calculating the number of upstream sells that flow into it.

**Water flow lines** - The drainage network is created from the flow accumulation. It is formed by natural erosion over time and is governed by topography (slope gradient), geology and rainfall. The map is useful for water management showing location and relative concentrations of water flow.

**Flow Directions** – an arrow, located at the base of each macadamia tree pointing down slope. Maps out the controlling influences of surface water flowing within a macadamia block. Arrows are colour coded for flow direction with respect to the tree line direction to indicate if profiling would be effective or if cross drains are required.

**LS Factor**-The LS factor forms part of the Revised Universal Soil Loss Equation (RUSLE). It is a measure of the potential erosion of a site as compared to a standard (slope gradient of 9% over slope length of 22.1m). It is a rather complex mathematical formula which takes into consideration both the slope length and the steepness of the slope. Numbers greater than one are of concern for bare (recently tilled) soil.

**Density** - The density of the canopy is related to the amount of light penetration. Imaging the density of LIDAR points that reach the ground beneath the canopy, provides a map of the degree of light penetration. The Density map also indicates the reliability of the DEM and associated models (flow accumulation, catchment areas) which also depend on the number of points reaching the ground.

**Canopy Height Above Ground** – the macadamia canopy height above ground can be imaged as a digital surface model providing a raster image or as generated contours. Point heights can also be determined at the location of each tree. The tree canopy height is a measure of tree condition, age and species/variety. It can also be used to calculate the biomass. For horticulturists it can indicate the soil conditions (nutrients, soil moisture) of the crop.

**Air photo** - the aerial photograph is presented as an orthophoto map, which is a rectified aerial photograph. A number of control points have been used to warp the photograph and remove the photographic distortion..

**> 10 deg slope** - areas of the property with greater than 10 degrees slope are defined. These areas are prone to greater erosion if no ground cover is present.

**Ridgeline** – the crest of hills defining the major catchment areas

**Macadamia trees** - tree locations are defined by either:-

- aligning a regular grid to the block of trees, or
- as regular spaces along the tree line.

The accuracy of plotting tree locations is dependent on knowledge of the tree spacing and the accuracy of the original planting out grid.

**Macadamia Blocks** - the boundary of each block is defined as the outer canopy drip-line.

**Property Boundary** – Property survey details taken from the DP plan. If survey marks are available they are used to locate the property, otherwise boundaries are aligned with fencelines from lidar intensity image.

**Grid** - 100m MGA (Map Grid of Australia) using datum GDA94