

Using LIDAR derived contours from ELVIS in OCAD

This document was created by Mark Roberts of Paradise Lost Orienteers in May 2018 as a substantial update to a document created in 2016 with help from Ken Dowling; this version of this living document is dated 1st June 2018.

The latest version of this document is available from www.markroberts.id.au/OQ/OQ_LidarFromElvis.pdf - please do not forward this document to other readers but instead direct them to that link.

It describes how to get contours from the LIDAR DEM data available from the federal government website ELVIS into OCAD 2018. The DEM functionality also exists in a slightly different form in OCAD 10/11/12.

Downloading from ELVIS

The following has been tested with Chrome.

Go to <http://elevation.fsdf.org.au/> and  past the splash screen if it is presented:

Elevation - Foundation Spatial Data

Here you can download point cloud and elevation datasets sourced from jurisdictions.

Find out more on our Elevation page.

Data can be downloaded at no charge but note that there is a 50GB limit per request (please check the file size before you download your files).

Click here for Free GIS Tools.

How to use

- Pan and zoom the map to your area of interest,
- Click on the "Select an area..." button to enable drawing,
- Click on the map, holding the button down,
- Drag to a diagonal corner (not too big, there is a limit of roughly 2 square degrees or 200 square km))
- On release we will check for data within or very near your area of interest
- If the list is large you can filter:
 - Partial text match by typing in the filter field and/or
 - You can restrict the display to either elevation (DEM) or point cloud file types
- Check against any file you would like to download. To reiterate, these files can be huge so take note of the file size before downloading
- Review your selected datasets and submit.
- An email will be sent to you with a link to all your data, zipped into a single file.
- These files can be huge so take note of the file size before submitting or downloading

Hints

- Hovering over many items will give you further information about the purpose of the item
- Drawing a polyline allows you to measure distance along the polyline.
- On completion on drawing a line the elevation along that line is plotted.
- While the tool to draw your area of interest is enabled it is easiest to pan the map using the arrow keys.
- There are many areas where there is no data though the coverage is improving all the time.



Pan and zoom to your area of interest using the mouse and mousewheel then click on
and drag a rectangle for your desired area.

It will now present a list of available datasets for that area:



QLD Government (Showing 9 of 9)

DEMs

Select all 1 Metre (Showing 4 of 4)

[\[show list\]](#)

Point Clouds

Select all AHD (Showing 4 of 4)

[\[show list\]](#)

Unreleased Data

Currently Processing (Showing 1 of 1)

[\[show list\]](#)



Geoscience Australia (Showing 3 of 3)

DEMs

Select all 5 Metre (Showing 1 of 1)

[\[show list\]](#)

Select all 1 Second (Showing 2 of 2)

[\[show list\]](#)

These are the datasets you want, select all:

Point Clouds

Select all AHD (Showing 4 of 4)

[\[hide list\]](#)

-  GoldCoast_2014_LGA_SW_538000_6890000_1K_Las.zip (57.7 MB)
-  GoldCoast_2014_LGA_SW_538000_6891000_1K_Las.zip (53.6 MB)
-  GoldCoast_2014_LGA_SW_539000_6890000_1K_Las.zip (50.4 MB)
-  GoldCoast_2014_LGA_SW_539000_6891000_1K_Las.zip (53.8 MB)

and press the Download button which appears:

[Download 4 selected datasets... \(Approx: 215.5 MB\)](#)

Now enter your email and click on [Start extract]:

Download datasets by providing email address and start extract

4 Selected Datasets (Approx: 215.5 MB)



QLD Government

Point Clouds

AHD 4 items totalling 215.5 MB

Email mark@markroberts.id.au

Email notification The extract of data can take some time. By providing an email address we will be able to notify you when the job is complete. The email will provide a link to the extracted data which will be packaged up as a single compressed file.

Start extract of datasets

Cancel

Within a few seconds (or minutes or hours) an email will arrive; click the link to download the .ZIP file. In my email client it doesn't look or act like a link so I have highlighted it in this image; I had to copy and paste into a browser to get the data:

Your requested data within the area bounded by latitudes -28.1102 to -28.10123 and longitudes 153.39407 to 153.40416 (in GCS WGS84) has been packaged and is ready for download.

Image

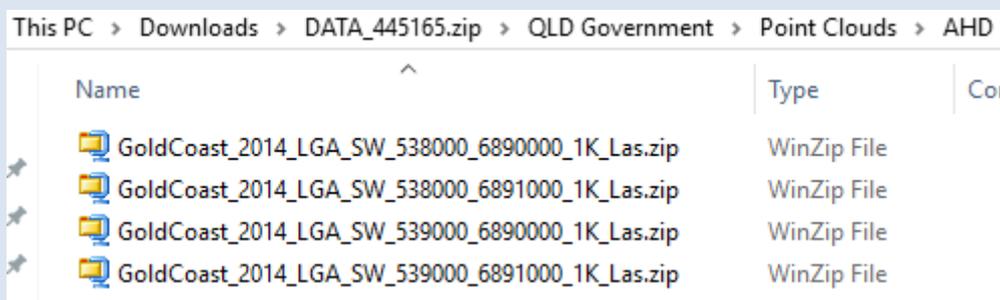
WARNING: The zip file is approximately 205.5 MB. You can extract data from a smaller area or select fewer datasets to decrease the size of the download.

Click the link below to download the data package:

http://download.elvis.ga.gov.au.s3.amazonaws.com/DATA_445165.zip

The data will remain available for download for 48 hours.

The download is a zipped/compressed file containing a russian doll arrangement of folders and eventually a series of zipped folders with your data. I find that the easiest way to extract the data from the ZIP files is to open a second Windows Explorer window at your destination folder, and drag the .zip file from one to the other, then right click / Open in Explorer and again drag the .laz file from the zipped folder to your desired folder:



This PC > SSD (F:) > Data > _ParadiseLostMaps > INPROGRESS > Hillcrest > GoldCoast_2014_LGA_SW_538000_6891000_1K_Las.zip

Name	Type	Compressed size	Password ...
Metadata	File folder		
GoldCoast_2014_LGA_SW_538000_6891000_1K_Las.laz	LAZ File	52,290 KB	No

Make the OCAD file

Use OCAD to create a suitable map file first up, and save as a template to copy for later use.

The map file needs the following settings in menu **Map / Set Scale and Coordinate System**:

A sensible **Map Scale**, neither very large nor very small, because OCAD may either corrupt the data with rounding errors or run out of map space.

The correct **Coordinate system** for your locality; mine is SE Queensland.

The **Real-world coordinates** don't seem to matter, as they will be corrected during the DEM import.

Set Scale and Coordinate System

Map scale: 1 : 15,000

Coordinates

Paper coordinates

Grid distance: 50.0000 mm

Real-world coordinates

Easting offset: 746000 m

Northing offset: 5843000 m

Angle: 0.00 deg

Grid distance: 1000 m

Coordinate system

Australia GDA94 / MGA zone 56 Choose...

Additional local offset

Easting: 0.00 m

Northing: 0.00 m

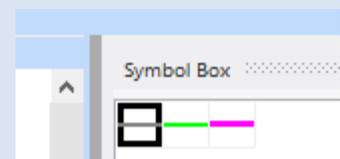
OK Cancel Help

The file needs three **line symbols** suitable for 1m, 5m and 25m contours.

It might be best to make sure these do NOT correspond with the contour symbols you are planning to use in the map. This keeps your original contour data quite separate from the map you are making, until you are ready to commit to the import. See the section "Importing Derived Contours" for a discussion of why you might do this.

Here is Ken Dowling's template file symbol palette; it has only those three symbols in distinctive colours:

However if you plan to import the 5m and 25m contours straight into your orienteering map, those symbols can be identical to the symbols in your target for a simpler import procedure.



file

Save a copy of the empty file, maybe in the same directory as the DEM data.

DEM Import and contour generation

Click **DEM / DEM Import Wizard**, click **Add...** and select the **.ASC** file, make sure the window looks like this and click **Next >** [NB – my PC ran out of memory when I selected all 4 files, I had to do them one by one.]

DEM Import Wizard

DEM Wizard

Choose DEM import files

Importable files

- GoldCoast_2014_LGA_SW_538000_6890000
- GoldCoast_2014_LGA_SW_538000_6891000
- GoldCoast_2014_LGA_SW_539000_6890000
- GoldCoast_2014_LGA_SW_539000_6891000

DSM import files:

Coordinate system

DEM files: UTM / WGS 84 Zone 56 South

Map: UTM / WGS 84 Zone 56 South

Convert height values from feet to meters

Convert height values from mm to meters

Shift elevations below sea level

Extent

All points

Only points within this extent

Minimum easting: 0

Maximum easting: 0

Minimum northing: 0

Maximum northing: 0

< Back Next > Cancel Help

Select what you need and click [Next]:

DEM Import Wizard X

DEM Wizard
Settings

Analyse files	
Minimum easting:	442000
Maximum easting:	443000
Minimum northing:	6932000
Maximum northing:	6935000
Points per square meter:	17.18

Data type of import files

Grid

Raw (cloud of vector points)

Points:	51,531,628
Rows:	4840
Columns:	1614
Minimum height value:	184
Maximum height value:	441

OCAD 2018 DEM

File name: ...

Create Contour Lines ?

Create Hypsometric Map ?

Create Hill Shading ?

Calculate Slope Gradient ?

Classify Vegetation Height ?

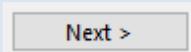
Extract features ?

Create Raw Data Points Map ?

Select the line symbols you want, check it looks like this,

The screenshot shows the 'DEM Import Wizard' dialog box, specifically the 'Create Contour Lines' step. The window title is 'DEM Import Wizard' with a close button (X) in the top right corner. Below the title bar, it says 'DEM Wizard' and 'Create Contour Lines'. There are two main sections: 'Create custom contours (no smoothing)' and 'Create smoothed contours using TPI'. The 'Create smoothed contours using TPI' section is checked. Under this section, there are four options: 'Form line contour interval' (unchecked), 'Contour interval main' (checked, set to 20.00 m), and 'Contour interval index' (checked, set to 100.00 m). The 'Create custom contours (no smoothing)' section has three options: 'Contour interval' (set to 1.00 m), 'Contour interval main' (unchecked), and 'Contour interval index' (unchecked). Below these is a 'Symbols' section with a 'Load symbols from template...' button. There are two columns of dropdown menus for selecting symbols for different contour intervals: 1.00m, 5m, 25m, 2.5m, 20.00m, and 100.00m. The 20.00m and 100.00m symbols are selected as '531.010 Fine line - temporary' and '531.009 Red line on loop map' respectively. Below the symbol selection, there is a checkbox for 'Use different symbols for depressions' which is unchecked. At the bottom, there are input fields for 'Minimum contour: 184 m' and 'Maximum contour: 441 m', and a label 'Total number of contour values: 258'. At the very bottom, there are four buttons: '< Back', 'Next >', 'Cancel', and 'Help'.

and click:



- Can handle only a limited number of files, three for example
- Don't need DSM only DTM for contours
- Intensity thing is very useful for subtle stuff like fences
- Contours imperfect at edges if separately imported
- Don't import non-contiguous files, result very bad
- Some settings have to be reapplied every time
- Switch off "load templates" x 2

Importing derived contours into your map

So far we have assumed that your map file full of contours is not your target map, but an intermediate step towards that, because:

- You probably don't want the 1m contours in your target map.
- 1m contours may however be useful as a background map.
- You probably don't want all of the rectangular-shaped download in your target map.
- You may need to experiment repeatedly with smoothing the contours.
- You may need to delete some contours depending on your chosen contour interval.
- You may prefer to use the LIDAR contours as a basemap, then redraw contours in the field.
-

Here are some hints for when you choose to import selected contours from another OCAD file into your target map file – or use it as a background map.

To export a selected area of the map use menu **Map / Export part of map**.

To export only the 5m and 25m contours use menu **Map / Export objects by selected symbols**.

First make sure your target map:

- Is georeferenced
- Uses the same coordinate system
- **Has the same scale as the contour map** – (otherwise offsets may not be corrected when importing)
- Has the same magnetic declination (when using as a background map)

During the import select **Use real-world coordinates** and **New offset**.

Much could be written about how to handle the symbols for the imported contours.

If you have special symbols in your contours file and you don't want to mess up your target map symbol set, when importing them select **Do not import any symbols or colours**. Now select a contour, select your contour symbol, and use **Object / Change all object with same symbol**; the same for index contours.