

Google SketchUp TECHNICAL WORKSHOPS

WORKSHOP 4 -Advanced Site Modelling

Outcomes:

- A reasonable technical understanding of OS referencing for accurately aligning contours to OS Cad bases
- A general understanding of SketchUp add-ons and their implications/ advantages for technical site modelling

As you go through the work shops, it is advisable to practice each step before continueing onto the next as there may be some trail and error needed, depending on computer specs, file sizes and settings.

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Examples:

The following pages explain the various stages needed to produce The model in Fig 1. Built upon detailed 5m topographic contours with an OS base plan draped over giving accurate building positions.

Because the model is built to pin point accuracy, it can be used for site analysis, technical visualisations and even accurate photo montages.

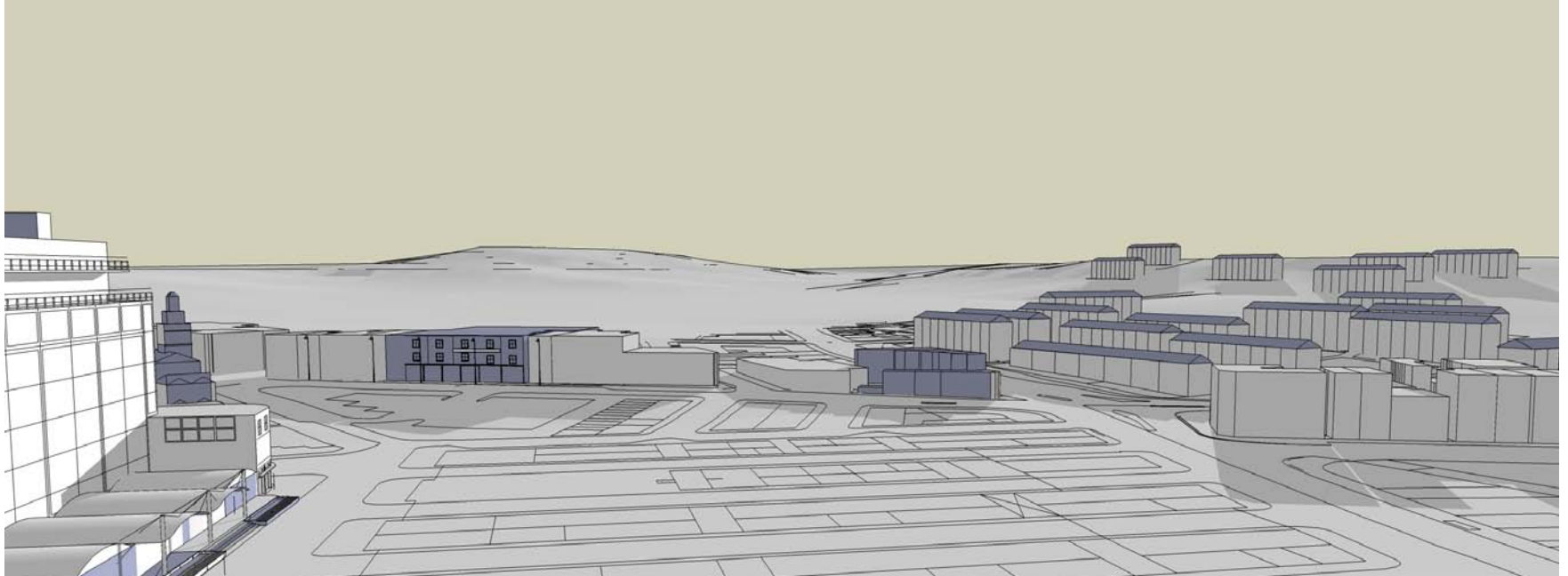


Fig1. Sneinton Market (Nottingham), Looking up toward St. Ann's

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Principles: Adding Contours To Your OS Cad Base.

Assuming you already have the OS base in dwg. format

To get OS referenced contours for your site, follow the instructions on the department of landscape site. (link below)

<http://www.shef.ac.uk/landscape/current/digimap.html>

Your contour file will come through as a zipped DXF. file (Drawing Exchange Format), this will open directly into AutoCad (Fig 1.)

Once you have the file in Cad, it is advisable to set the units to metres and save as a dwg.

Before you overlay the contours on the OS base, turn off unwanted layers to leave just the contour lines (Fig 2). **Note:** do not delete the unwanted info as you may need these in the future

The contours are now ready to overlay the OS base, assuming you already have the OS base in dwg format continue over page. If not see instructions on the department of landscape website (follow link above) to get OS base.

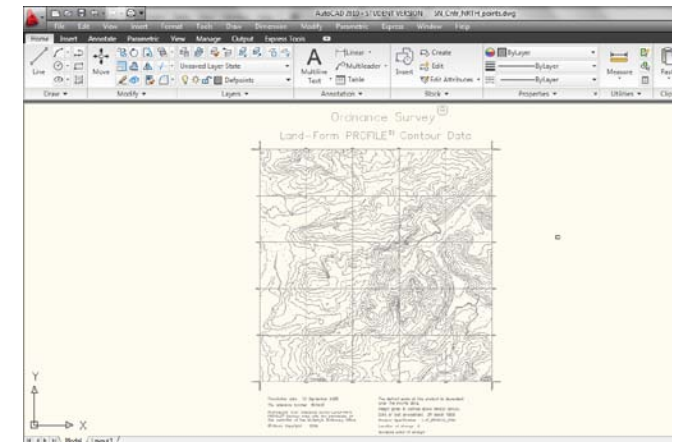


Fig 1.

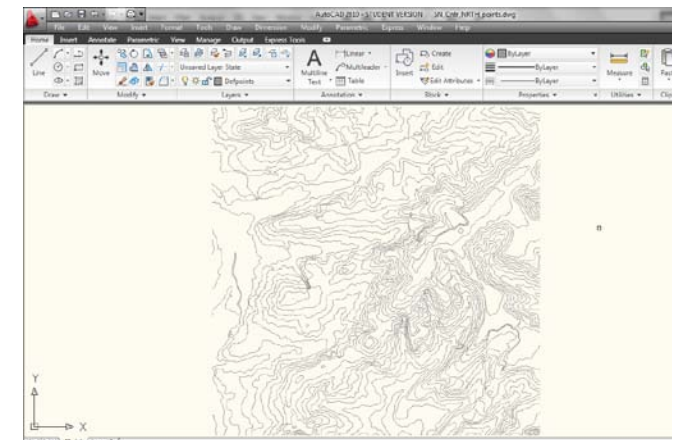


Fig 2.

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Principles: Adding Contours To Your OS Cad Base. Continued.

Contours, like all other objects in AutoCad have a 3 dimensional position (X,Y & Z axis). The X&Y position relates to where the object sits in the world co-ordinates (also known as eastings and northings) with the Z axis giving the height above sea level. You can use these attributes to check the height of a contour (Fig 1.)

As the contours are OS referenced in the same way as the OS base, you can accurately line the two up within AutoCad. **Note:** Make sure you have set the units on both to the same (for landform it isn't important which).

There are various ways to align the base to the contours, either importing as an xref, block or simply copying all objects. For this exercise there is no preference but 'un-grouped' copying is the easiest.

Firstly open both the files in AutoCad. Remembering to set the units, copy all the objects from your contour file (Ctrl+A) and copy with base point 0,0,0. ('Ctrl+Shift+C' and type '0,0,0' 'Enter'). 0,0,0 refers to a zero point on all 3 axis within Cad.

You now need to paste the clipboard contents (all objects copied) to the same 0,0,0 reference point in your OS Base file. ('Ctrl+V' and type '0,0,0' 'Enter') Your contours should now overlay the OS Base (Fig 2.). Now your file is ready to import into SketchUp. (If they do not line up, See Troubleshooting over page)

Note: If your contours download as seperate tiles (usually 5x5km) combine them in one file using the same method as above. (copying from 0,0,0, and paste to 0,0,0)

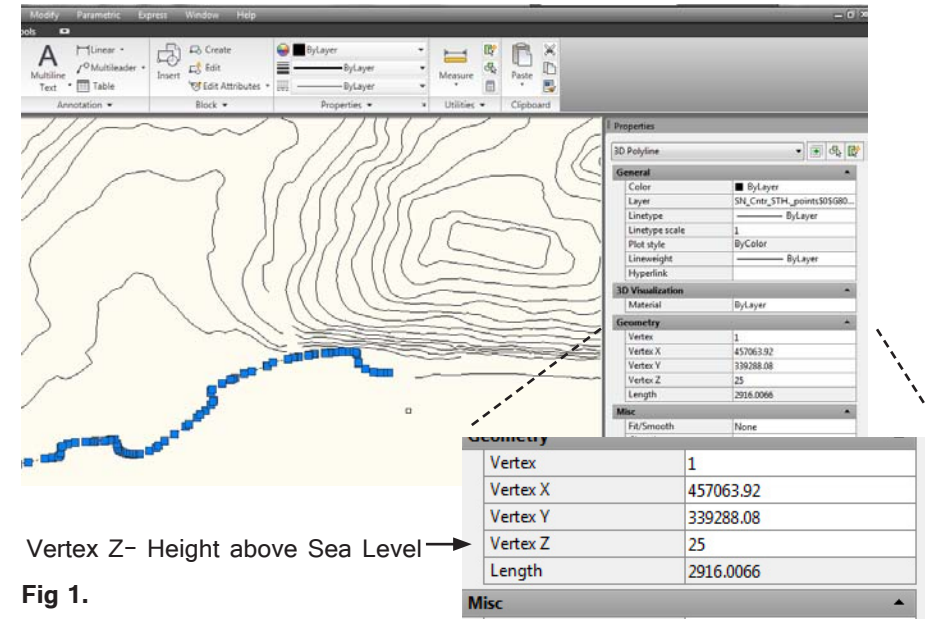


Fig 1.



Fig 2.

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Principles: Adding Contours To Your OS Cad Base. **Trouble Shooting**

Problem: **Contours don't line up with OS Base (Fig 1.)**

Cause:

1. Units in original files are different
2. Base or contours have been inadvertently moved
3. World UCS (user coordinate system) set different in original files

Fix:

1. Check and set units equal in original files
2. Delete moved file and download again. (DO NOT MOVE Contents)
3. Set both UCS in original files to 'world'. In each file, type 'dducs' this will open UCS toolbar (Fig 2.) select 'world' click 'set current' and 'ok'. then type 'plan' and select 'set current' from the option (or hit 'Enter' twice. Now copy one file contents into the other as before.

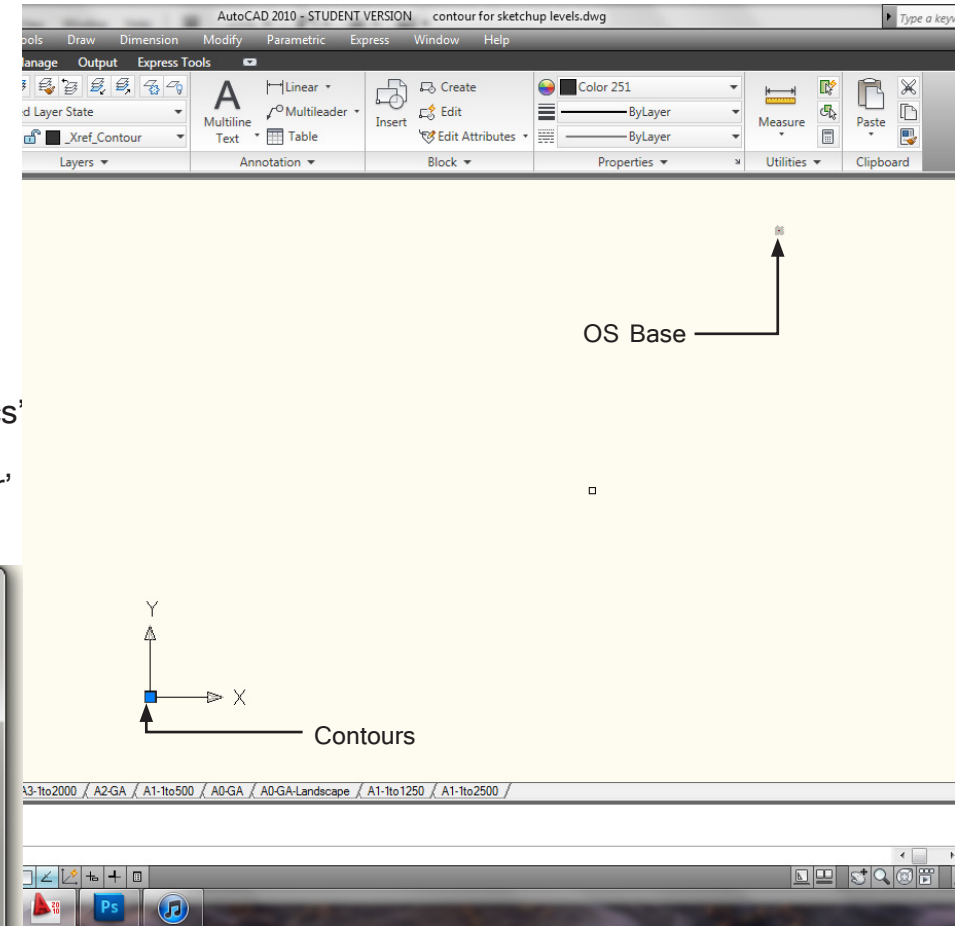


Fig1.

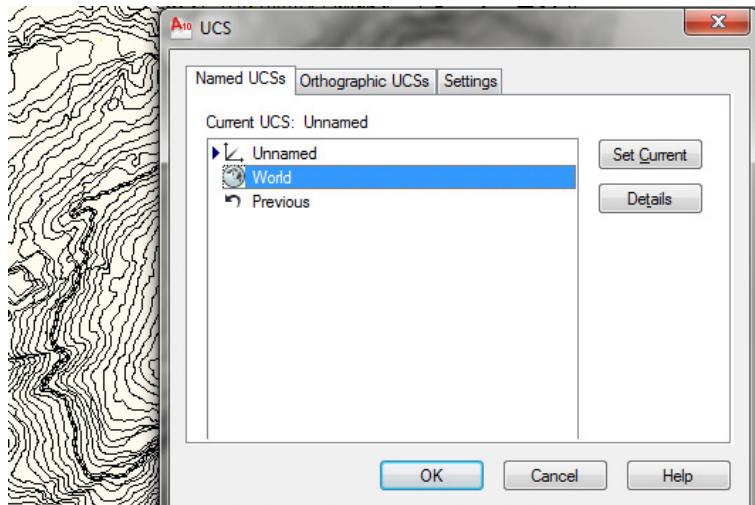



Fig 2.

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Principles: Using SkethcUp SandBox To Create Smooth, Contoured Landform.

Using SketchUp Pro (available on University computers) import your combined AutoCad file into SketchUp. Note: SketchUp doesn't always scale the model correctly so re-scale the base as per Workshop 2, Detailed document setup.

Now group the two components (OS base and Contours) as separate components. Then select all the contours (being sure not to select any of the base) (Fig 1.) and click the 'from contours'  button on the 'sand box' tools (Fig 2.)

Note: It is sometimes useful to move your OS base above the contours when smoothing the contours, But you MUST be sure to only move it along the blue axis.

When the % load bar is active (Fig 3.), do nothing as even opening/using other programs will use RAM and may cause SketchUp to Crash (dependant upon computer speed and file size.)

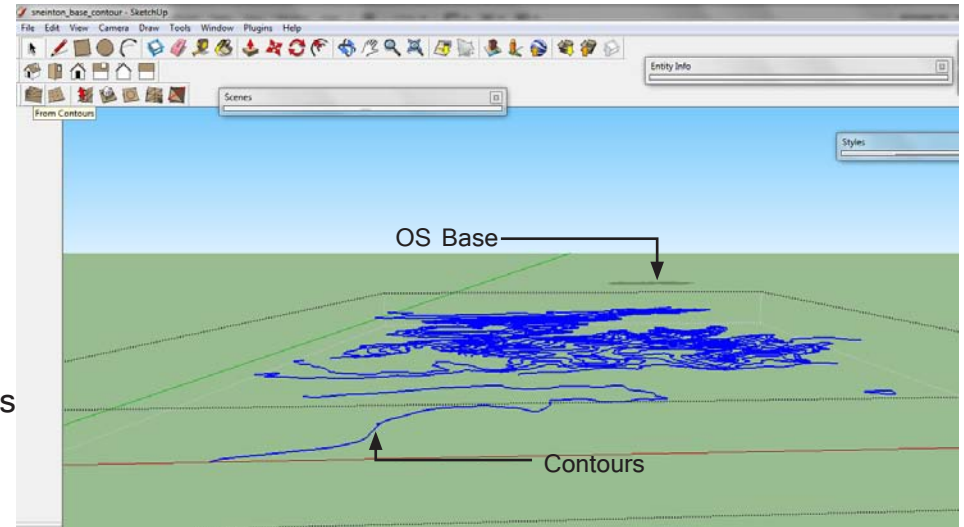


Fig 1.



Fig 2.

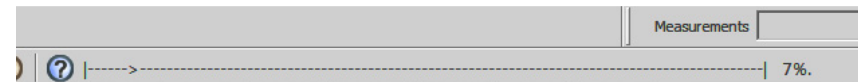


Fig 3.

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Principles: Draping OS/ Sketch Base Onto Contoured Landform.

'Draping' the OS base onto the smoothed contours will accurately draw the building footprints, roads and objects onto the undulating base without distorting them.

It is advisable to move the contour lines onto a separate layer and switch them off (this will speed up 'draping').

Explode the grouped OS base (the original can be re-grouped after) and select all objects within it. (Fig 1.) Click the 'Drape' button on the 'sand box' tool bar, and when prompted select the face you want to drape onto (The smoothed contours). This process may take a long time, but once completed you will have a smoothed contour base with OS buildings and roads. (Fig 2.)

Note: When the % load bar is active, do nothing as even opening/ using other programs will use RAM and may cause SketchUp to Crash (dependant upon computer speed and file size.)

Next Steps: You can now populate your topographical model using similar steps as in 'Workshop 2, Building Your Representative Model, Existing/ Bounding Features', or if you have already built it on a flat base, simply copy and paste buildings, features and components.

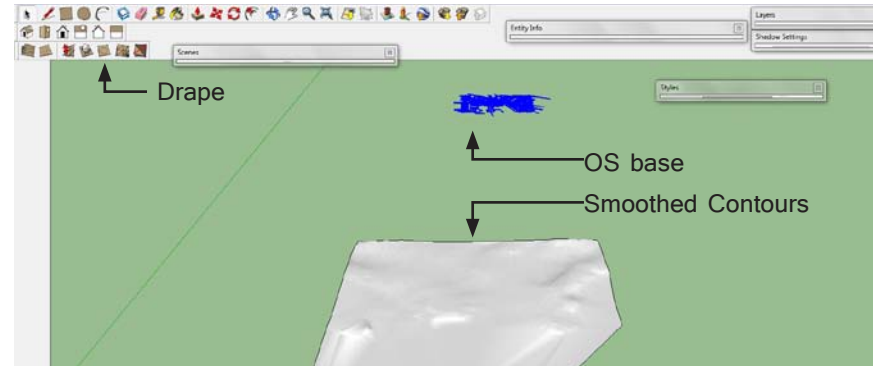


Fig 1.

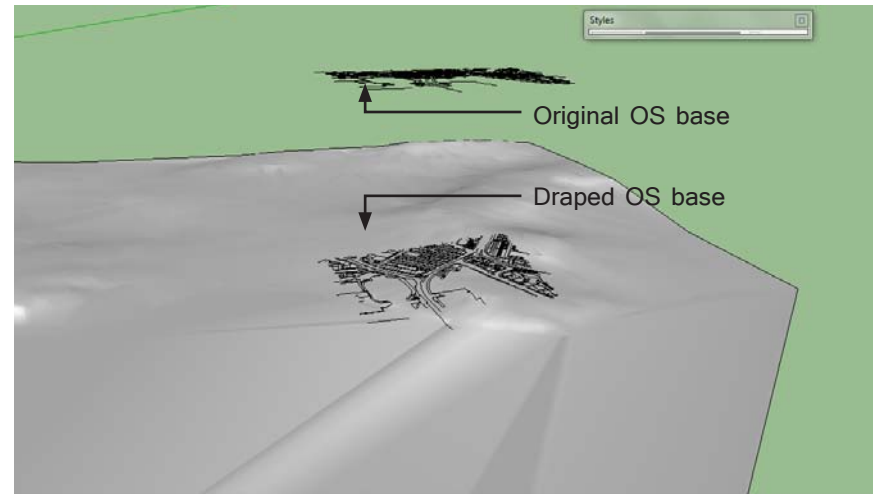


Fig 2.