CityCAD – Tool Summary

Authors

Name	Organisation	Origin
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Info

Date:
2008 - Version 1.0
2010 – Version 2.0

Place of origin:
London, UK

Homepage:
http://www.holisticcity.co.uk/

References:

- Holistic City Software, 2010. CityCAD Online Help. *CityCAD*. Available at: http://www.holisticcity.co.uk/citycad/onlinehelp/ [Accessed April 6, 2010].
- Holistic City Software, 2009. holistic city - CAD Software in Urban Design - Good or Bad? *Holistic city*. Available at: http://www.holisticcity.co.uk/index.php?option=com_content&task=view&id=268&Itemid=181 [Accessed September 2, 2009].

Latest use:
Some case studies since 2008.

Download:
http://www.holisticcity.co.uk/index.php?option=com_docman&task=cat_view&gid=62&Itemid=132

Description

“CityCAD ® is a ground-breaking new technology that allows true, integrated, holistic analysis of your urban masterplans in the early design stages.
It can significantly improve productivity on city design, planning and development projects, while maintaining and enhancing design quality. You can also import 3D DXF models, assign data such as floor areas to them, and place them in your city model.
CityCAD was the first CAD application created specifically for the city design and planning community. Even if your team hasn't used much CAD before, CityCAD will enable you to quickly sketch 3D models of large scale urban masterplans and easily test many different development ideas.

What is CityCAD?

CityCAD is the first major 'city information modelling tool' to be released for the city design and planning community. You can use it to create information-rich models of large urban masterplans. It is a **parametric** tool, meaning that if you change the design, all information such as floor areas, costs, densities and numbers of units are all updated automatically and instantaneously.

City Design / Masterplanning

If you are an architect, city designer or masterplanner then CityCAD can save you a huge amount of time.

Quickly sketch and edit your masterplan, and watch as your floor areas, densities, car parking and other numerical data are calculated automatically. Reduce project costs, and free up more time for exploring options and enhancing design quality.

Sustainability

If you are working on large scale masterplans, CityCAD allows you to easily keep track of a wide range of sustainability and quality-of-life indicators.

Planning / Communities

If you are involved with planning or supporting communities, CityCAD can help you explore development options in an easy-to-understand, transparent, objective and inclusive way.

Movement Engineering

Easily keep track of engineering information - if the design is changed, all data is recalculated instantly. Topics: Street Design, Accessibility, Parking and Trip Generation, Environmental Impact Assessments, Utilities and Infrastructure.

Property Development

Quickly sketch a model of your development, add cost and value rates, and totals will be instantly calculated. You can use CityCAD to test a huge number of development scenarios very quickly, and at little cost. If you make changes to your model, such as changing the density of residential blocks or the size of buildings, everything is updated instantly.

Education

CityCAD is a valuable teaching aid which can easily explain the complex relationships between urban form, density, sustainability and urban economics."

Key Theoretical Background

No specific academic references to be found in the available documentation. Some references to local UK policy:

- The Embedded Land Uses are built into CityCAD, and are based on the UK Planning Land Use Classes.

The design process model envisaged using CityCAD:

Principles behind CityCAD that are to do with design outcome (not process):

- *Create urban spaces not object buildings* - Most CAD applications make it easier to create object buildings instead of urban spaces defined by buildings. CityCAD makes it easy to 'draw' streets and spaces first.
- *Identify risks and opportunities* - CityCAD models can be colour-coded to show variations in cost, density, slope and many other variables. Quickly identify strategic risks and opportunities in your masterplan.

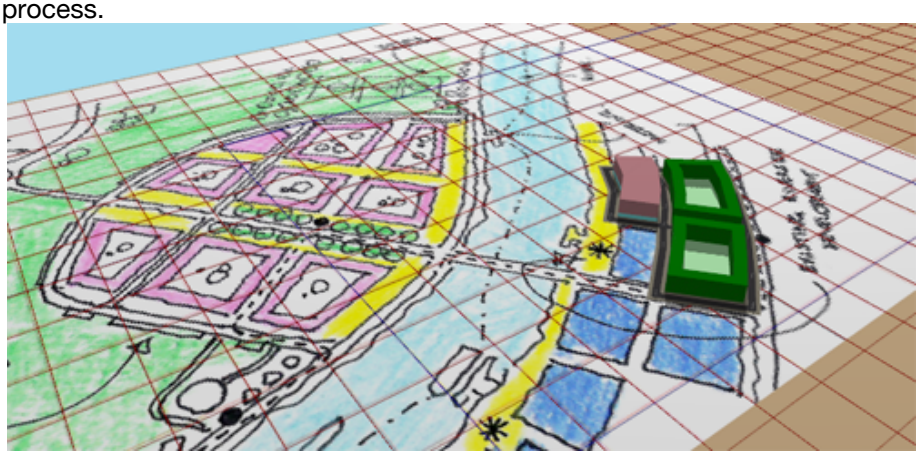
SUD Framework

There is no clear sustainability framework or approach. The tool consists of a collection of analyses that should provide information to feed such a framework.
Sustainability is one of the topics addressed:
“CityCAD enables you to test many aspects of a masterplan's sustainability. You can enter different energy and resource use rates for each land use, and the total will be continuously updated when you make change to the design. This means you can quickly see the effect of design changes on the total environmental impact.”
The indicators that contribute to it are organised according to the following main categories:

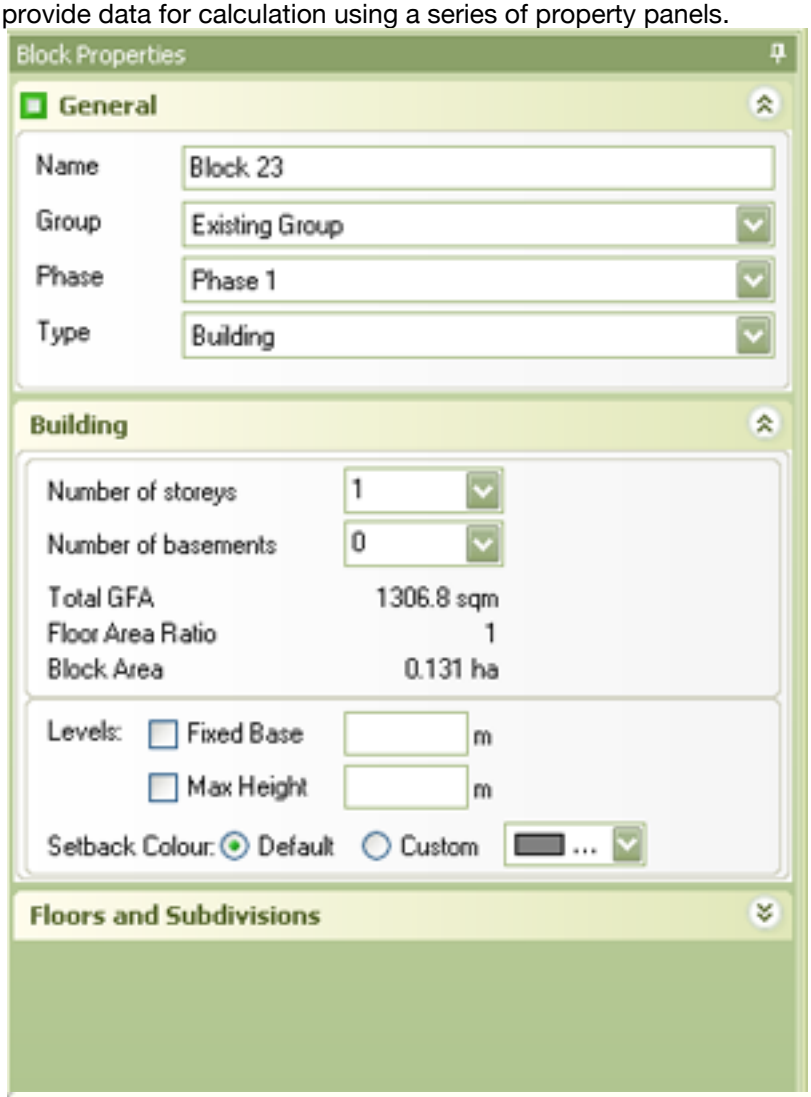
- Activity
- Environmental
- Liveability
- Movement
- Appraisal (Economic)

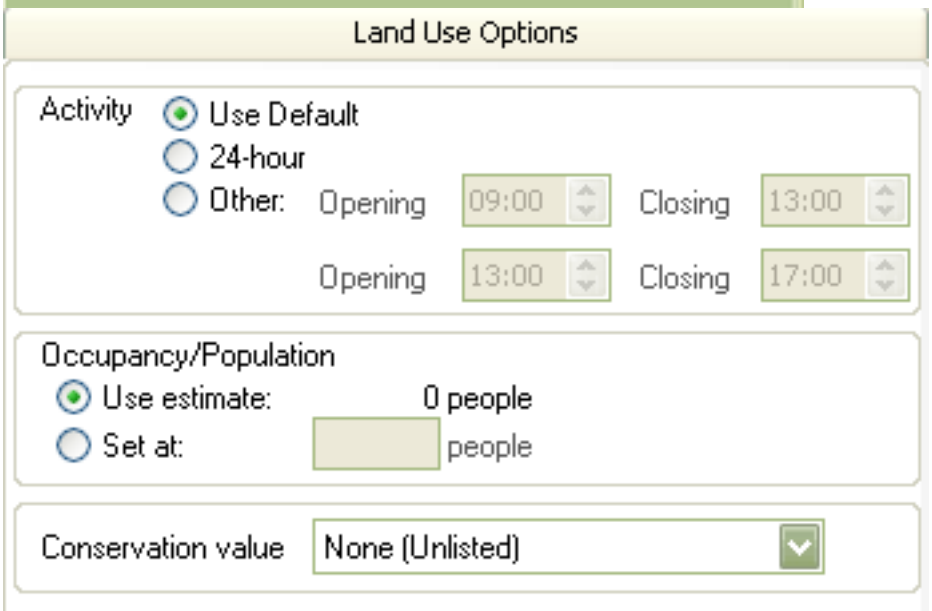
Input

“You can specify the location of your masterplan in the world […]”
The user needs to design the complete masterplan within CityCAD. It can import a basemap for manual drawing, or convert a drawing to CityCAD routes to facilitate the start of the process.

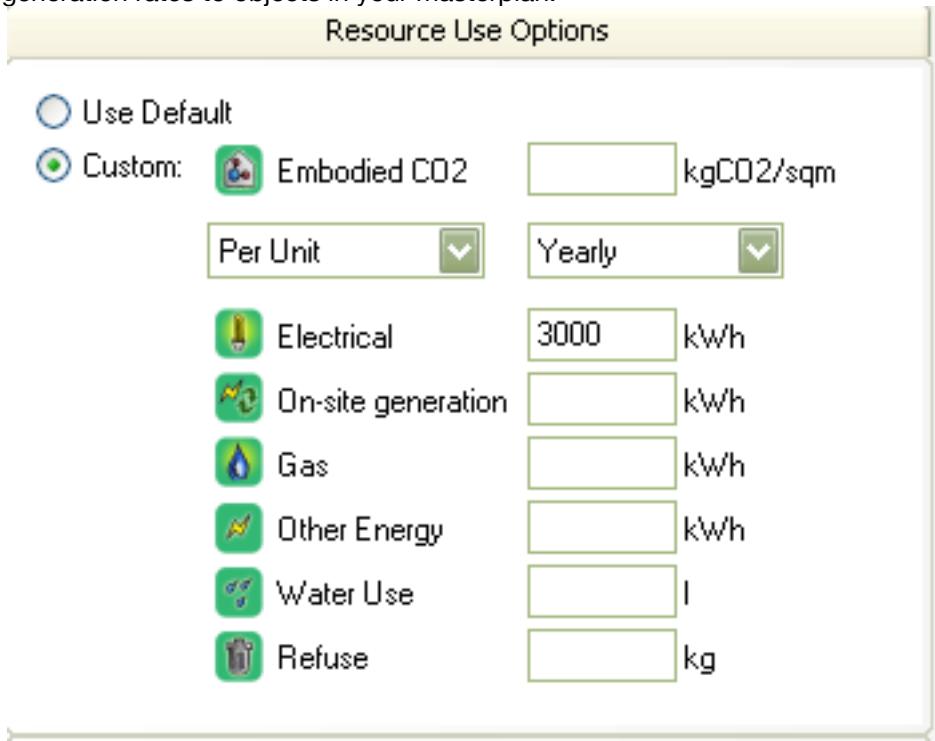


The various attributes are then assigned to buildings, routes (streets) and other elements to provide data for calculation using a series of property panels.





"You can specify on-site generation rates for different land uses, and assign energy generation rates to objects in your masterplan."



"Set values for: You can enter weekly, monthly or annual rates:

- Embodied CO2
- Electricity Use
- Gas Use
- Other Energy Use
- Water Use
- Refuse Generated

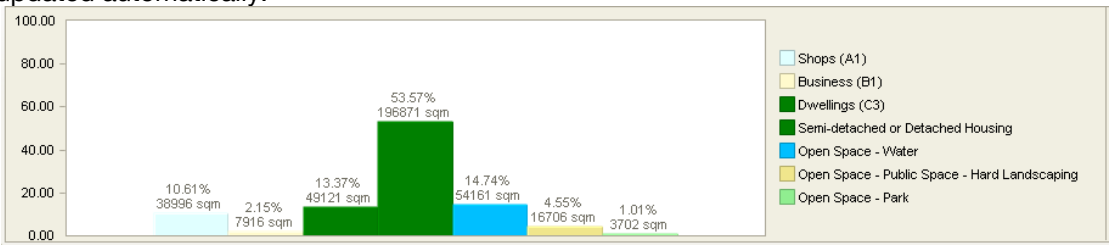
You can enter weekly, monthly or annual rates:

- Total (for the block or subdivision)
- Per Unit
- Per sqm GFA (or sqf depending on unit system)
- Per Person"

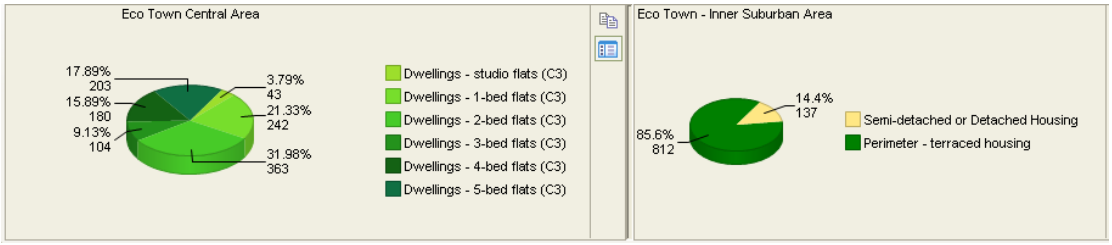
The URB file which contains the design information can be edited in any text editor, but it's meant to be edited via the properties panels.

Methods

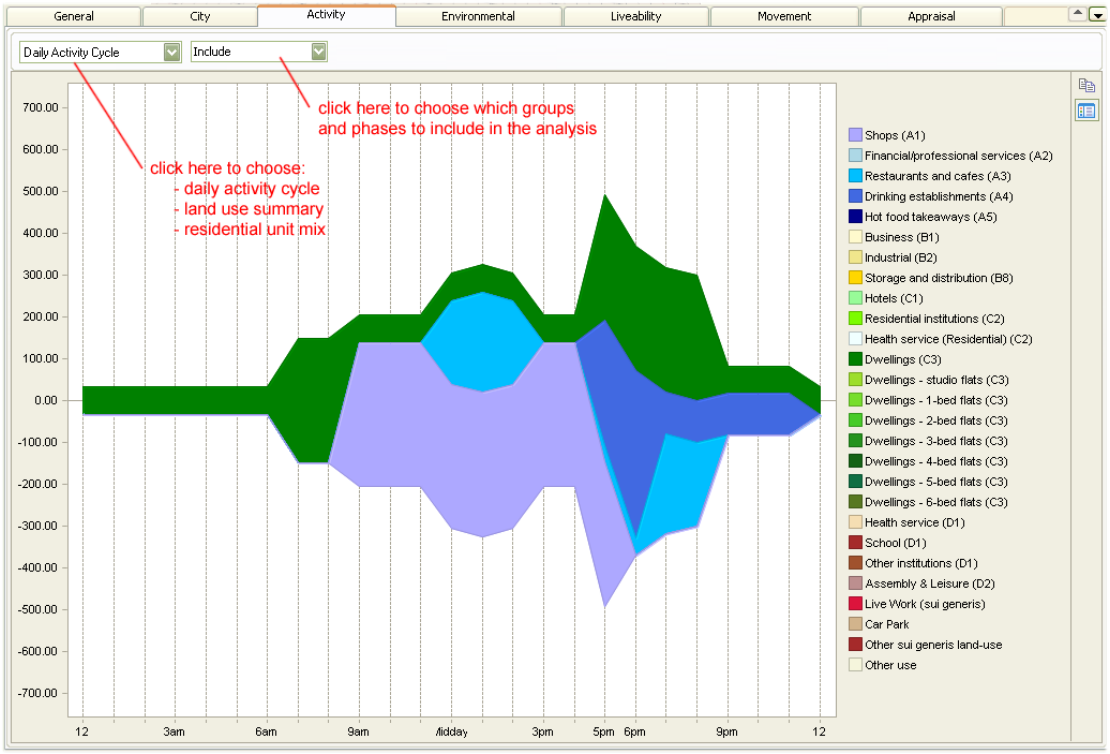
"Please note that numerical information generated by CityCAD should only be used for broad feasibility analysis, and is not intended for use at the detailed design stage."
The various indicators are gathered in analysis tabs according to the SUD principles. "As the city model is adjusted in the main display window, all information in the city analysis panel is updated automatically."



land use panel (part of activity tab)

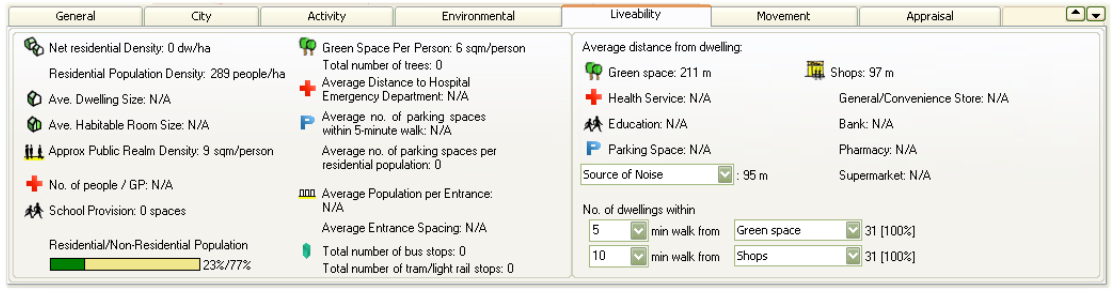


residential mix (part of activity tab)

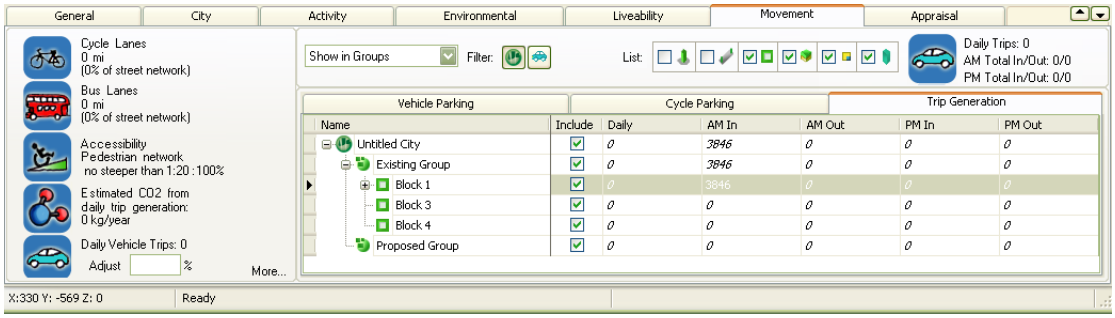


Activity tab

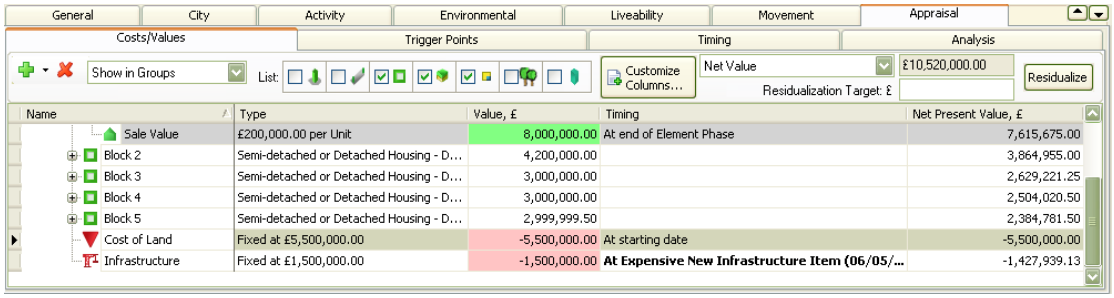
Environmental tab



Liveability tab



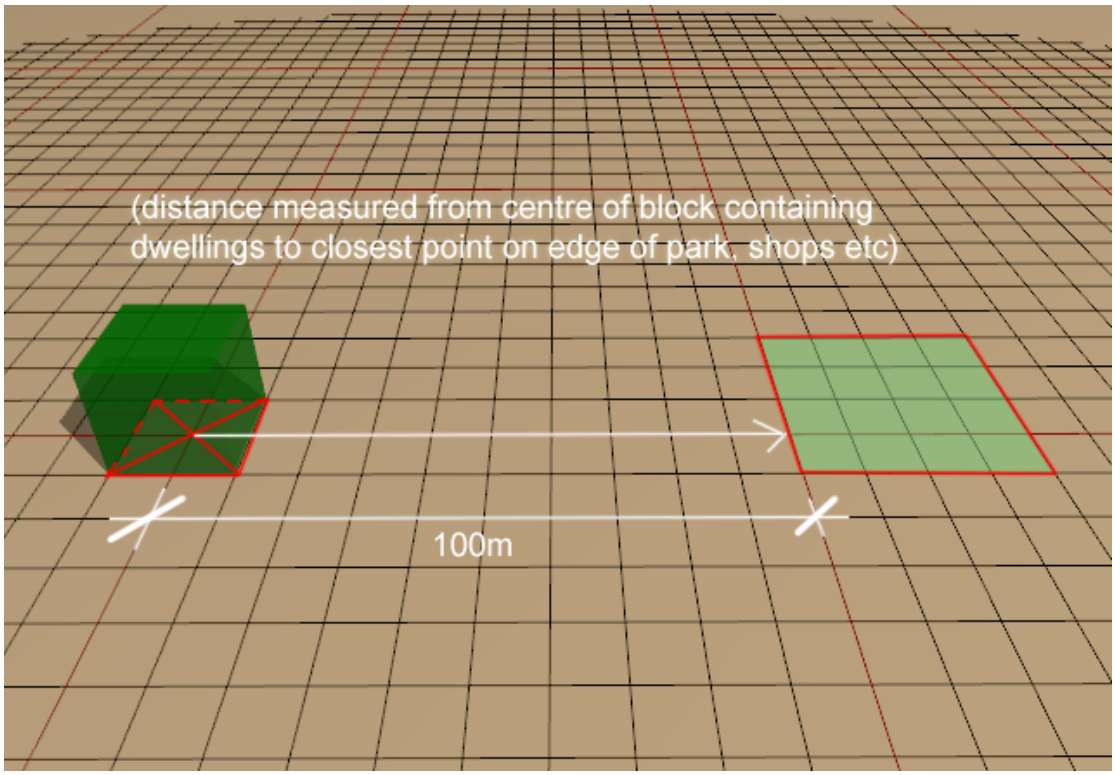
Movement tab



Costs/values tab

The assumptions behind the following methods are described in the documentation:

- Perimeter Block Terraced Housing - calculation of number of dwellings.
- Detached/Semi-Detached Housing - calculations of plot sizes, GFA, FAR etc.
- GFA, NFA, Space for Habitable Rooms - diagram.
- Setbacks and Block Area - principle of adoptable highway.
- Average distance to shops, green spaces etc
- Average width of bus or cycle lane
- Entrance Density
- Route Gradient

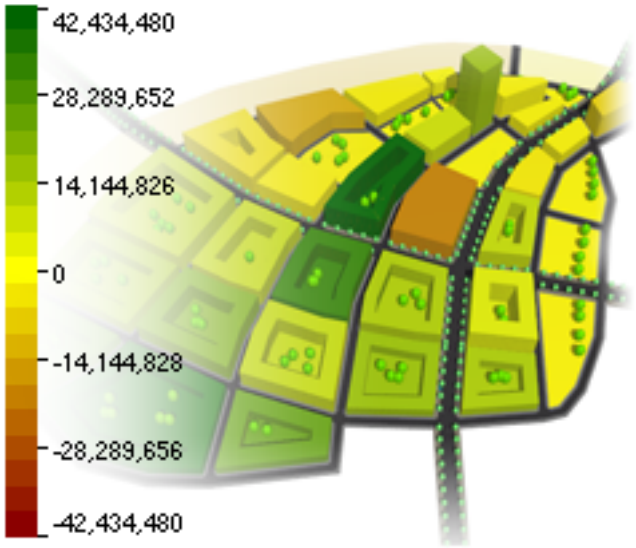


For the cost analysis the following calculations are performed and defined:

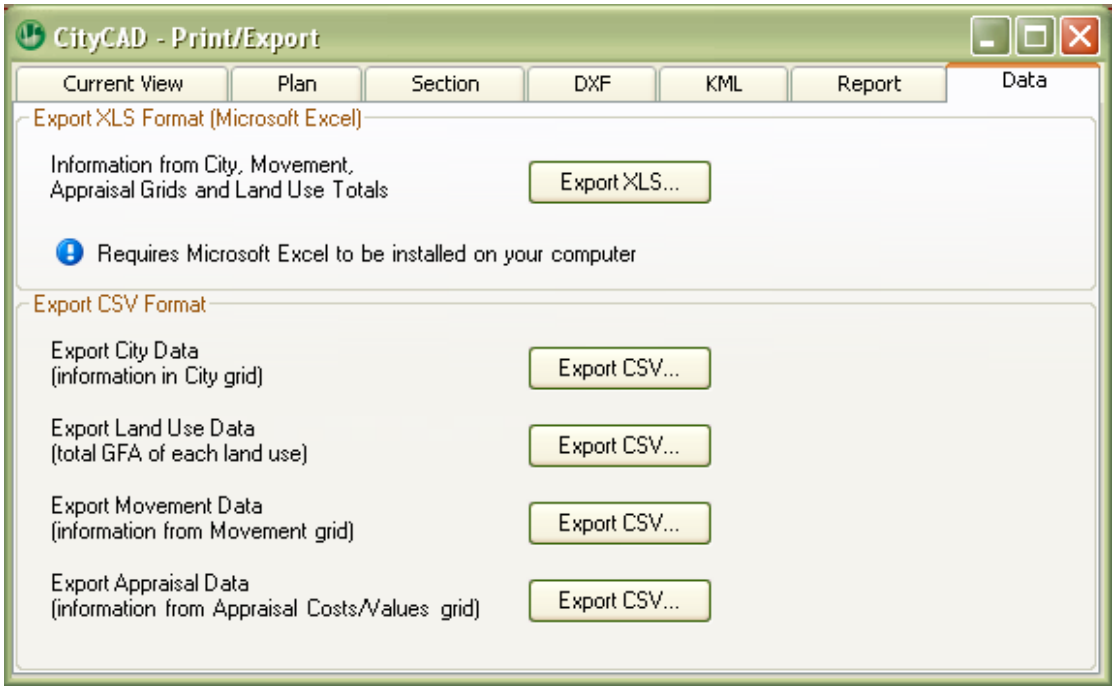
- **Net Present Value** - the present value of the appraisal item, based on the timing setting and the interest rate set in the appraisal preferences.
- **Total Costs** - total of all cost items
- **Total Construction costs** - total of all construction cost items
- **Total Income** - total of all income items
- **Total Sales Income** - total of all sales incomes
- **Total Rental Income** - total of all rental incomes
- **Total Capitalized Value** - total of all capitalized values
- **Gross Floor Area** - total GFA
- **Net Floor Area** - total NFA
- **Number of Units** - total number of units (both residential and non-residential
- **Number of Res Units** - total number of residential units
- **Net Residential Density** - average net residential density

Output

It offers a variety of outputs of the design and the analysis.
It has a 3D visual output of the design including thematic mapping of some information onto objects.

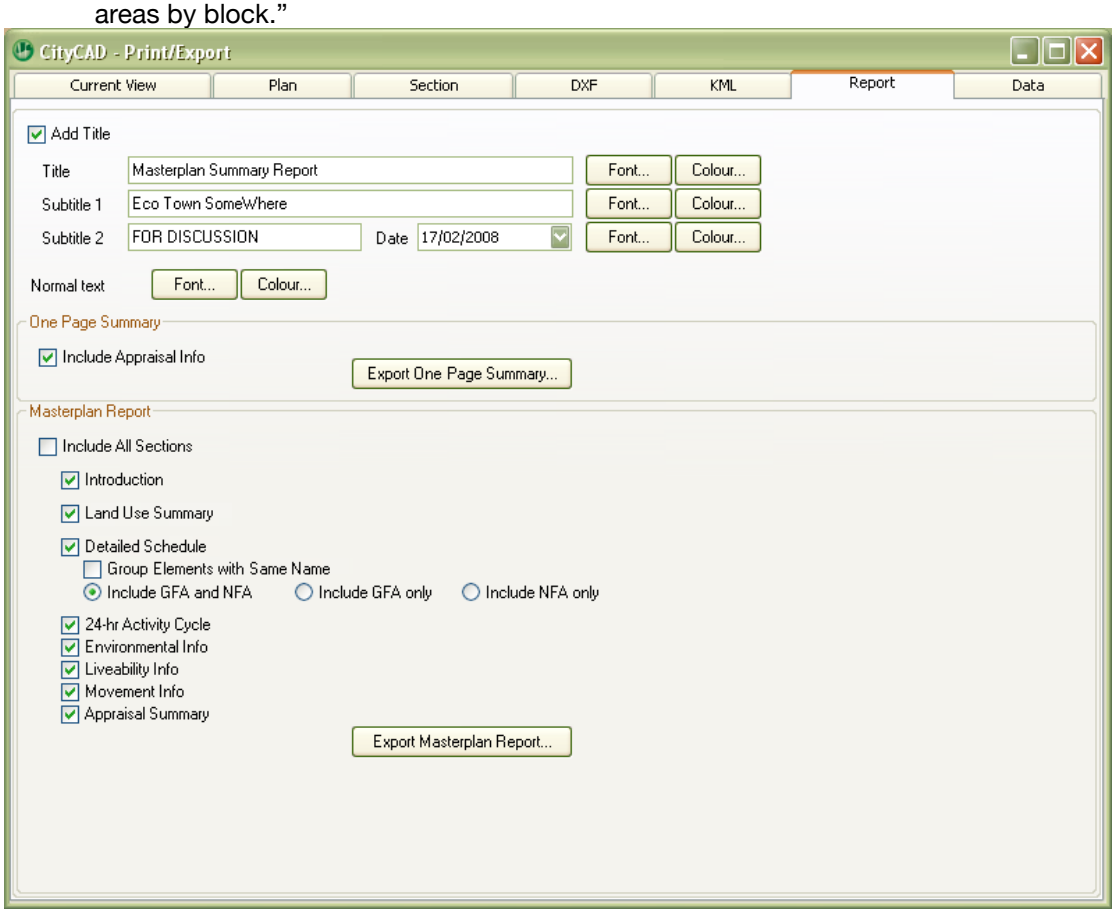


“You can use this tab to export the contents of the City, Land Use, Movement and Appraisal Grids as data files. You can export them into csv (comma separated values) format, or as tabs in a Microsoft Excel spreadsheet in XLS format.”



"You can export two kinds of reports:

- A quick 1-page summary - showing key information and land use totals. window.
- A longer masterplan report - with more detailed information, and breakdown of floor areas by block."



CityCAD – Tool Review

General

Background

Plus:

- Route as the basic building block
- User-friendly interface
- Holistic approach (CIM)

Minus:

- No context
- No true networks
- No GIS data management
- Simplistic spatial analysis
- No academic/evidence background
- Can't handle much data
- No attribute selection

Application (Scale and Design Phase)

Is explicitly for neighbourhood or masterplan design during early design phase. Spot on.

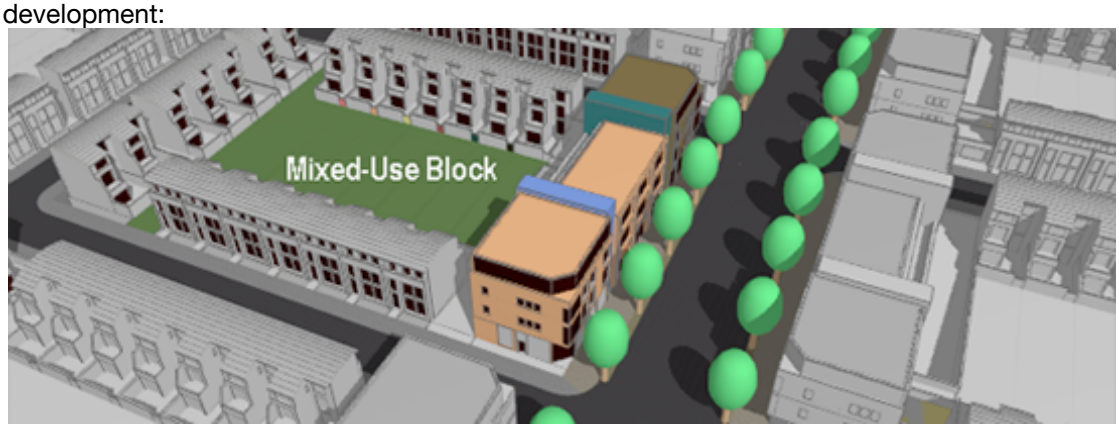
Sustainability Principles

Not a clear and sound approach, it draws from a collection of not evident sources and non-explicit individual experience. This can be a barrier to the adoption of a tool by a wiser and wider community. This way it's penetration will be limited to non-experts and those that do not take these issues really as their core work.

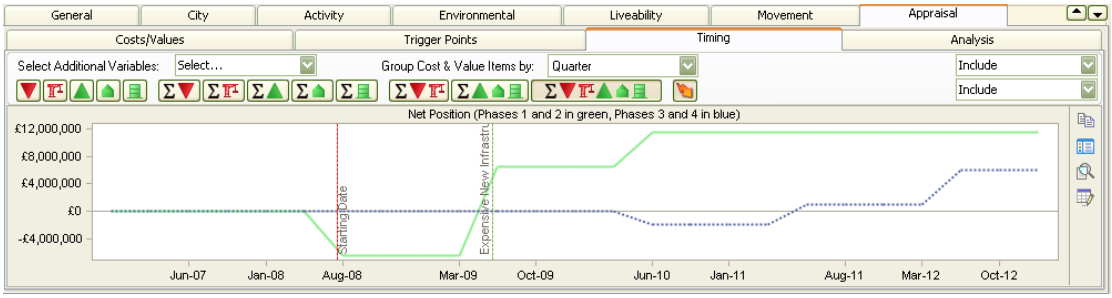
Assessment Criteria

Indicators and Calculation Methods

The calculations are not always explicit, although they are in most cases simple statistics like totals and averages based on the values entered in the properties windows. The most complex calculations' assumptions are explained in the help file.
It does not perform any type of spatial analysis, except route gradient.
The context is never considered, it can be added just for visual background of the development:



Time is explicitly considered at two levels: daily use and in cost analysis it provides a timeline of investments and returns. This is however short-term development and use time, and not the kind of long term planning that sustainability requires (as with long distance relations).



It has a “trip generation” table not for analysis but to provide some numbers of trips and do a rough calculation of CO2 emissions. The trips numbers can eventually be fed into other dynamic transport models or other types of movement and accessibility analysis.

Output

It’s just analysis, doesn’t perform evaluation per se, but has a variety of outputs and provides a rich source for design and decision support.