# c1

## Landscape design and CAD - gCADPlus?

Good landscape design is all about communication - matching the ideas and aspirations of clients to what a skilled, experienced designer knows is possible. Today, a landscape designer needs to be many things - part artist, part botanist, part photographer, horticulturalist. They need to be able to sell themselves and their ideas. gCADPlus software has been created to allow landscape designers to showcase these skills and communicate e ectively with clients. This book teaches gCADPlus CAD concepts using practical landscape design examples taken from real jobs. It is an interactive document that includes many movies that show how to implement CAD drafting steps.

This first chapter provides an overview of how CAD software can be used by landscape designers.

*"A garden is a place to live and share. A lawn, surrounded by cedar hedges or laurel belongs to the past. Lawns are water-intensive and require regular maintenance and so are minimized. Today, outdoor spaces must be treated as those inside - carefully and thoughtfully. Hedges and screening become places of life. Life moves, and the garden brings color, volume and fragrances to become a place to live and escape the pressures of life. - Sylvie Bion"*

## About CAD and landscape plans

The use of modern computer software has revolutionized the way in which landscape plans are developed. Not only can gCADPlus deliver a classic design plan with a border and site details, plotted to a scale in double quick time, but the plan can include images illustrating design concepts and accurate counts of the type and number of species used in the design. Any symbol (such as an outdoor furniture group) can have extended information [e.g. Manufacturer] attached to it.

*Landscape design created using gCADPlus showing the design at left and images of species selected for the design on the right together with the designers logo.*

*Ornamental garlic used to enhance vertical space.*

*Mixed border*

De la Fleur au Jardin

S. BION Paysagiste–conceptrice

## Adding images to CAD drawings as an aid interpretation

gCADPlus includes a plant and hardscape database. This tool enables images to be located and inserted quickly. It is also possible to use site location data from Google Maps, add extended data about paving, furniture and other 'hardscape' elements such as lighting and irrigations information directly in the file. Since many clients have di culty understanding 2D designs - gCADPlus exports to SketchUp so 3D CAD models can be built easily.

*Utilitarian tree guards can have appeal.*

*Objets d'art stimulate imagination. Quebec Canada.*

*Encourage walkers to take a path. Castle of Limelettes, Brussels*

*Objets d'art stimulate imagination. Belconnen, ACT.*

*Old wooden bridge - Cistercian abbey of Aywiers (Belgium)*

*Examples of images used to illustrate design ideas in gCADPlus plans.*

*Conveying landscape design concepts by embedding computer generated 3D models into gCADPlus plans.*

Book1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Add-Ins Acrobat

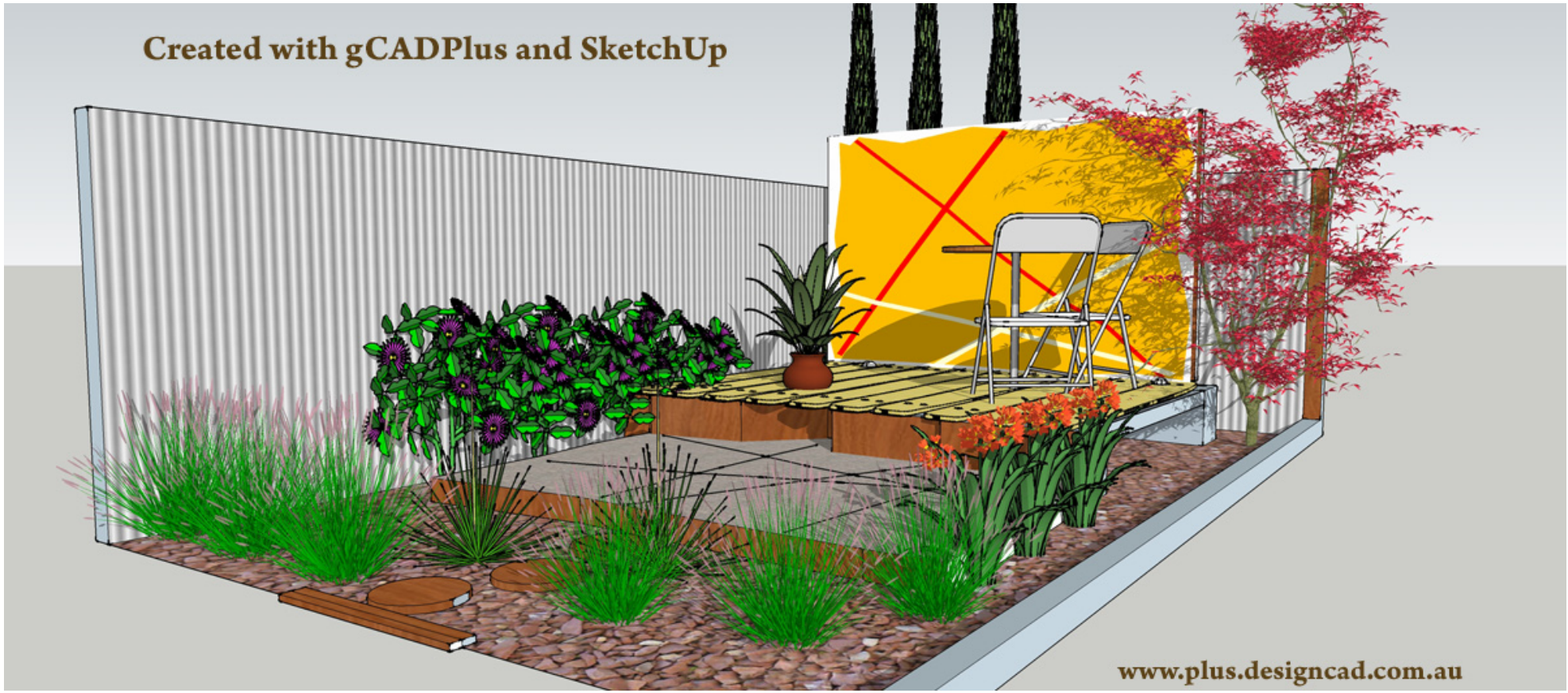
From Access | From Web | From Text | From Other Sources | Existing Connections | Refresh All | Connections | Properties | Edit Links | Sort | Filter | Clear | Reapply | Advanced | Text to Columns | Remove Duplicates | Data Validati

Get External Data | Connections | Sort & Filter | Data T

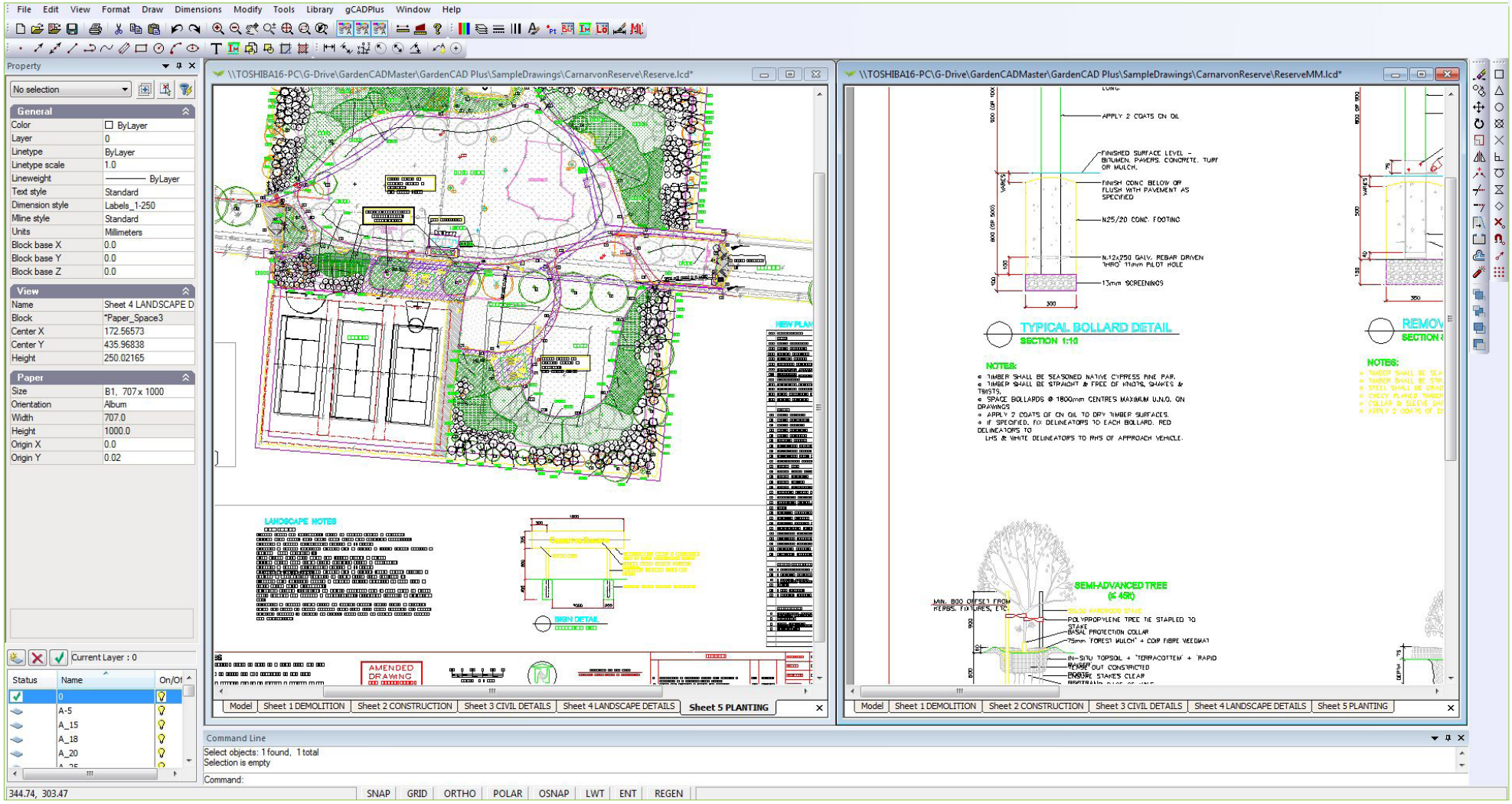
A1 fx No

| | A | B | C | D | E | F | G | H | I | J |
|---|---|---|---|---|---|---|---|---|---|---|
| 49 | 48 | Dypsis decari | 3.868291 | -32.618034 | Shadow | 0 | | | | |
| 50 | 49 | Dypsis decari | 16.358573 | 25.145114 | 0 | 0 | | | | |
| 51 | 50 | Kentia palm | 30.816142 | -27.142949 | 0 | 0 | | | | |
| 52 | 51 | Kentia palm | 7.974832 | -9.894337 | 0 | 0 | | | | |
| 53 | 52 | Kentia palm | 7.094996 | -6.987052 | 0 | 0 | | | | |
| 54 | 53 | Kentia palm | 30.153428 | -31.772705 | 0 | 0 | | | | |
| 55 | 54 | Kentia palm | 27.37481 | -28.530985 | 0 | 0 | | | | |
| 56 | 55 | LargeCar | 11.376213 | 12.381406 | Layer2 | 0 | | | | |
| 57 | 56 | Phoenix roebelinni | 30.068088 | -14.861918 | L-GRASS | 0 | | | | |
| 58 | 57 | Phoenix roebelinni | 31.240548 | -12.888753 | L-GRASS | 0 | | | | |
| 59 | 58 | Phoenix roebelinni | 29.267383 | -12.002258 | L-GRASS | 0 | | | | |
| 60 | 59 | Phoenix roebelinni | 31.404964 | -12.998363 | Shadow | 0 | | | | |
| 61 | 60 | Phoenix roebelinni | 29.431798 | -12.111868 | Shadow | 0 | | | | |
| 62 | 61 | Phoenix roebelinni | 30.232503 | -14.971528 | Shadow | 0 | | | | |
| 63 | 62 | PlantNumber1 | 0.589255 | 1.06903 | 0 | 0 | | | | |
| 64 | 63 | t2 | -12.061285 | 0.106018 | L-LIGHTING | 0 | | | | |
| 65 | 64 | t2 | -15.502617 | -1.282017 | L-LIGHTING | 0 | | | | |
| 66 | 65 | t2 | -12.724 | -4.523737 | L-LIGHTING | 0 | | | | |
| 67 | 66 | Trachelospermum jasminoides | 0.127573 | -22.810205 | 0 | 0 | | | | |
| 68 | 67 | Trachelospermum jasminoides | 0.172844 | -34.173151 | 0 | 0 | | | | |
| 69 | 68 | Trachelospermum jasminoides | 0.385616 | -9.342171 | 0 | 0 | | | | |
| 70 | 69 | UPlantGrass01 | 29.640111 | 23.833074 | RearGarden | 0 | | | | |

Sheet1 Sheet2 Sheet3



So a CAD drawing is much more than a replacement for a paper plan. A landscape plan prepared using gCADPlus is a communication device that gives the client an accurate rendition of what changes are intended for a site, provides multiple and detailed sheets containing dimensions and setout data such that the design can be implemented by any competent construction team without too much referral to the designer. gCADPlus helps increase productivity.

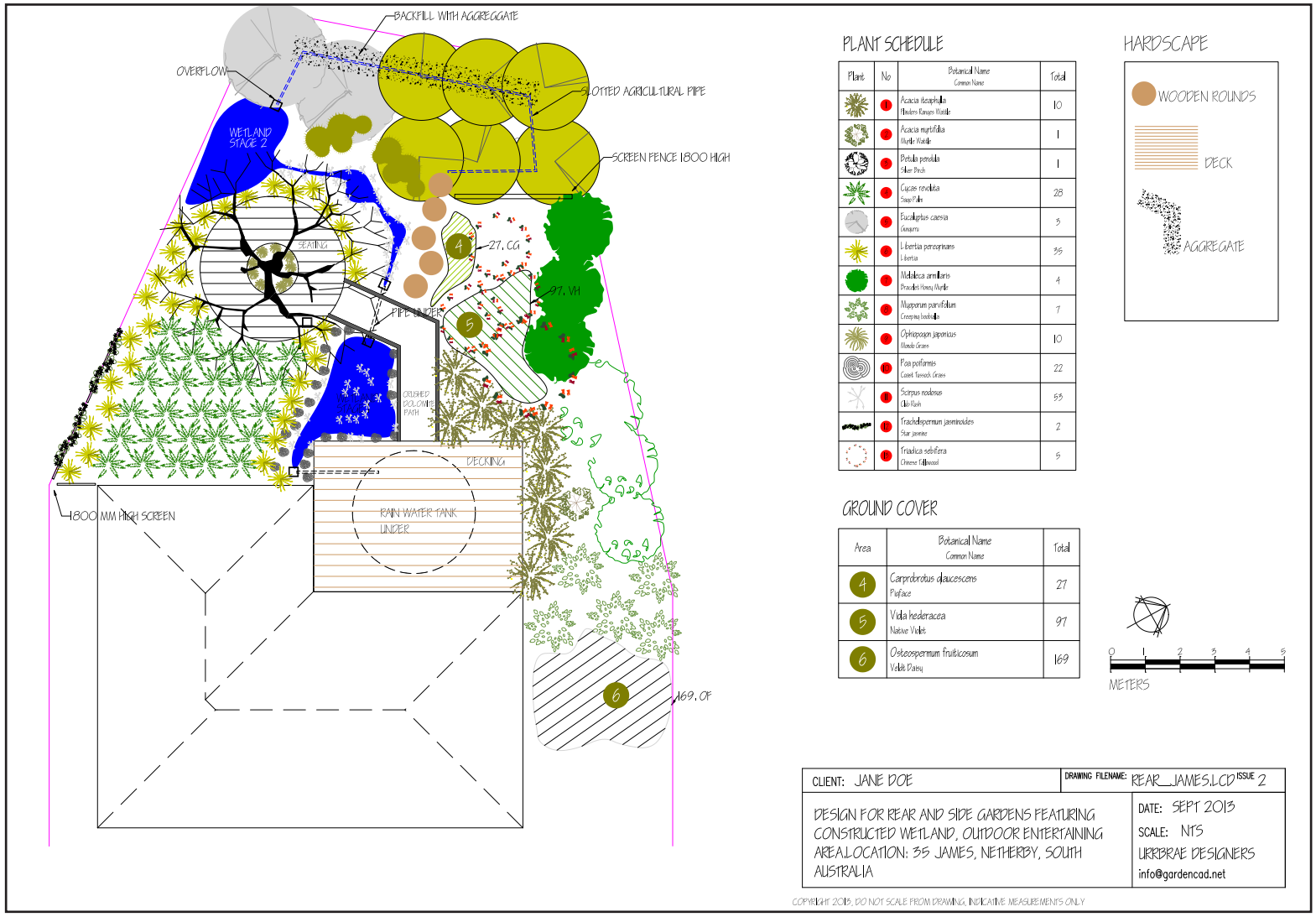



*Landscape plan on the left and detailed planting information on a second sheet - all from the one gCADPlus drawing file.*

Typically, plans will include some or all of the following; Location of ‘hardscape’ elements - paths, decking, ponds, drainage network, water storage, lighting etc., soft landscape elements - planting, a plant species schedule with number of each species required, site location, north point, scale indicators, general notes etc.

The figure below shows a typical landscape plan for a fairly small site. This type of plan could be drafted either by hand or with CAD software. However, it’s our belief that where projects become relatively complex and clients request more information than can be supplied on a single sheet, then CAD drafting is far more e cient than hand drafting. From one CAD model, many sheets can be produced.

A major benefit is that plans can be emailed to clients. Plans can be printed to PDF at di erent resolution - low for distribution across the net, high for printed versions for the client. Use the zoom tool in your PDF viewer (usually Adobe Acrobat Reader) to zoom in and check on the level of detail in this plan.




*Landscape design for a constructed wetland in a suburban backyard.*

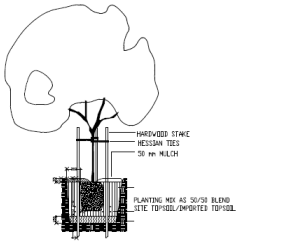
Note that dimensions for the construction team are part of this design, but are not shown here. They have been placed on a separate layer and that layer turned o when this particular layout view was printed.

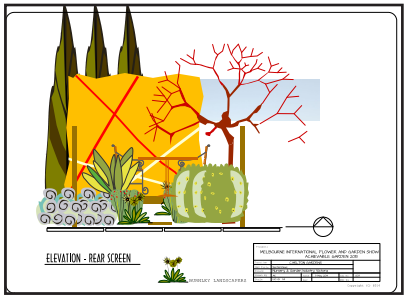
*Tip: When CAD is used, much additional information can be presented to the client without additional drafting effort. Examples of additional information might include section and elevation details, irrigation layouts, details of water storage, pond construction, how to plant advanced trees and shrubs, ground cover planting, species detail, photographs of artwork to be installed and so on; all from the same base drawing. Some of these (not necessarily from the plan above) are shown in the figures below. Being able to quickly produce this type of information adds a great deal to the communication between designer and client.*

With a small amount of extra e ort, these CAD drawings can even have an organic 'hand drawn' feel.

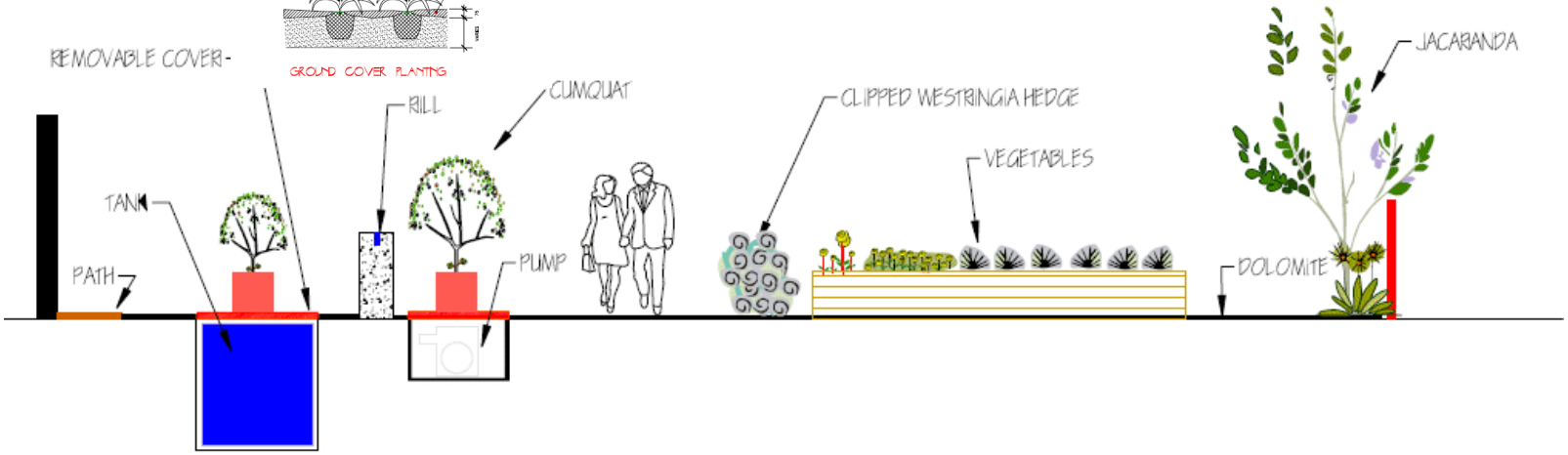
## Working remotely - saving paper and postage

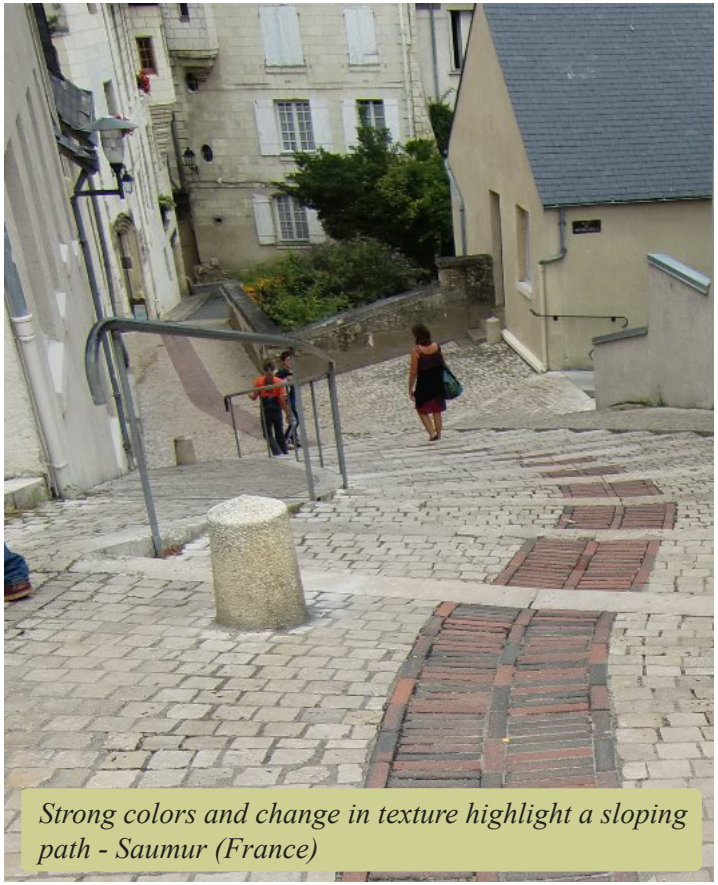
Producing plans with CAD software has the very real benefit because the design can be emailed to a client to view your work. We know designers who carry out the whole design process while on site. They then email the drawing to the client while on their journey back to base. The process is fully digital, with concomitant saving of time, energy and paper.



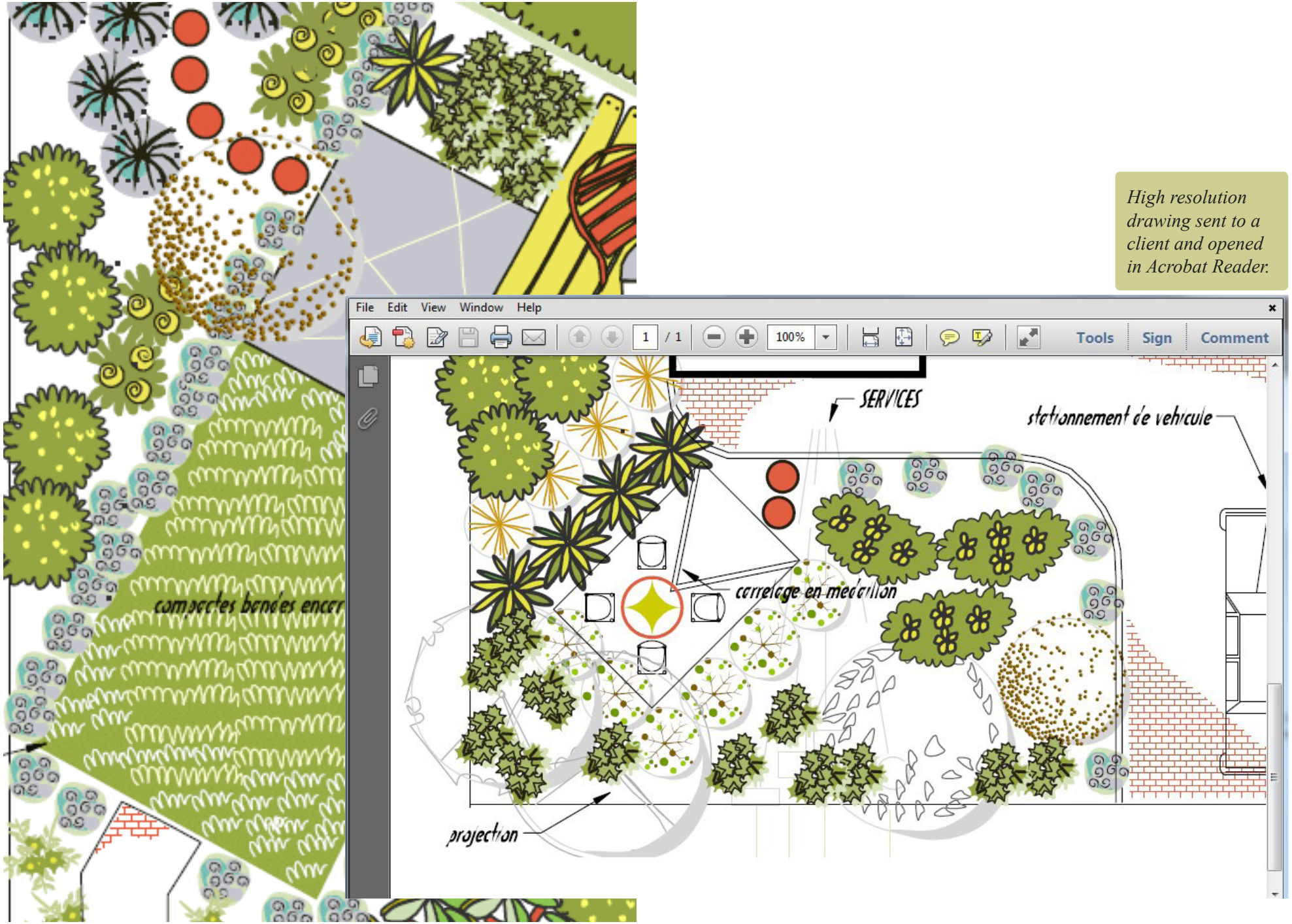




*Click the image above to view a multi page PDF file from a complete job as sent to the client.*



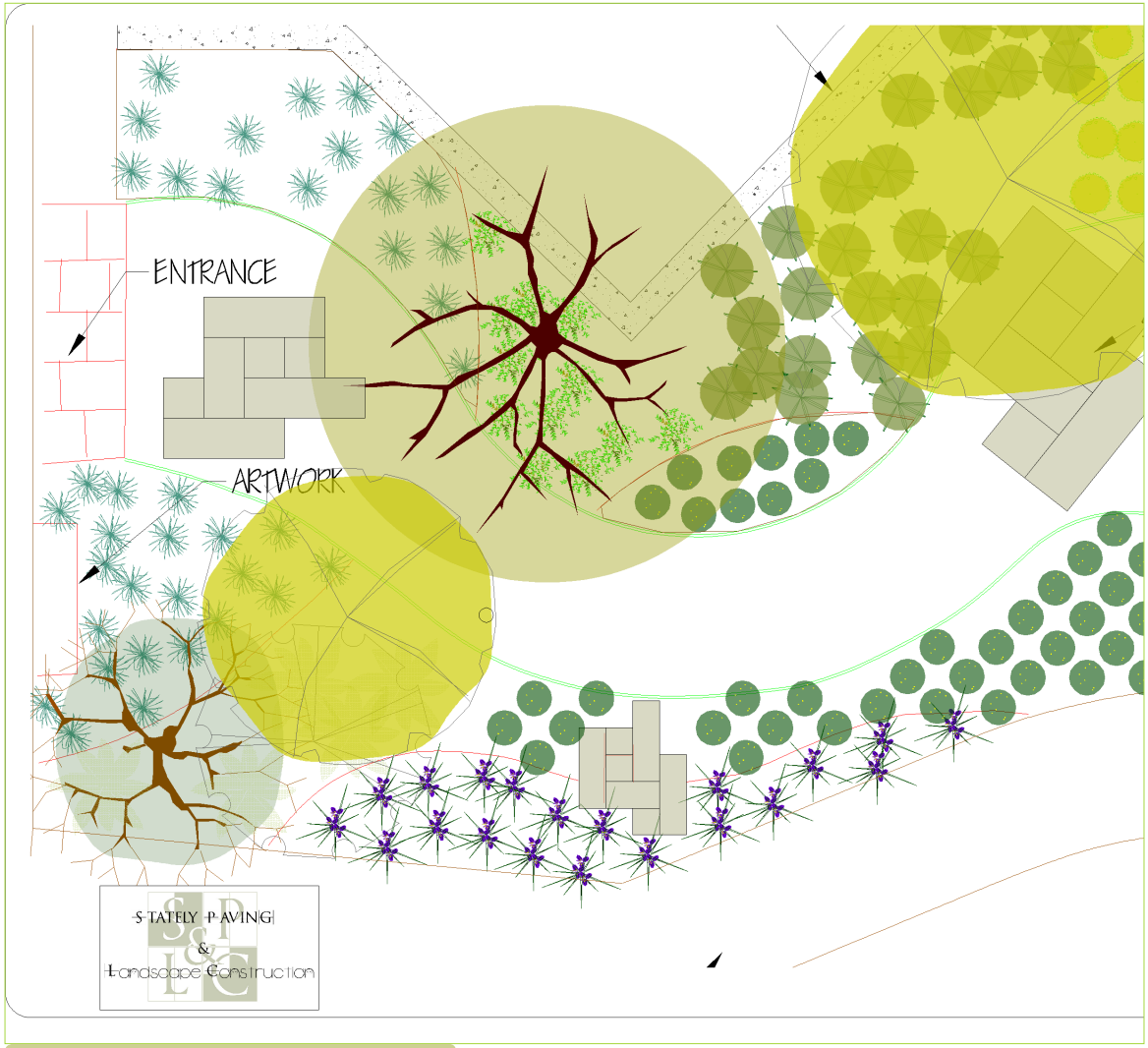
*Strong colors and change in texture highlight a sloping path - Saumur (France)*




*High resolution drawing sent to a client and opened in Acrobat Reader.*

## Copying and pasting materials can save drafting effort

Software also provides an opportunity to leverage past design work. The design shown below was developed in gCADPlus software and images of the final result were included in CAD layout sheets as examples of the sort of finish that a construction team can deliver (image courtesy StatelyPaving). It is easy for a client to visualize the type of planting and paving proposed for her design from an image such as this. A picture alongside a plan is a powerful way to communicate with your client.

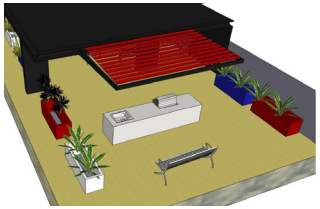



*Portion of gCADplus plan.*

*A picture is worth a thousand words!*

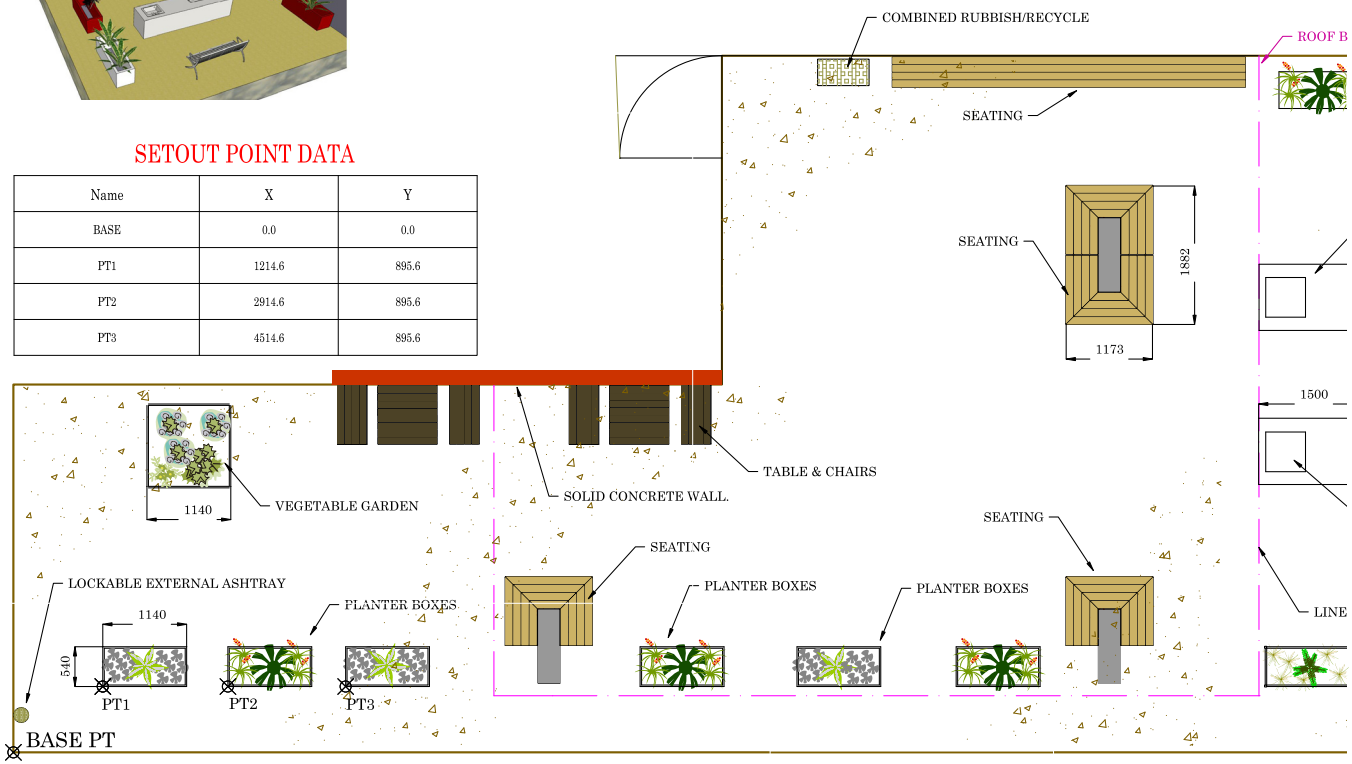
Similarly, a client can be shown a finished design for a rooftop garden as a guide complete with setout data

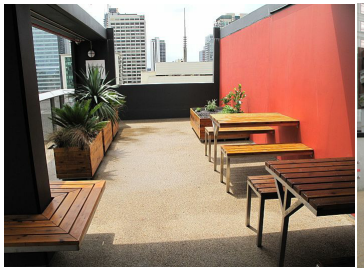
Designs such as these can be combined with the CAD plan allowing details such as dimensions, plant schedules, and the coordinates of set out points can be included as an aid to construction teams.



SETOUT POINT DATA

| Name | X | Y |
|---|---|---|
| BASE | 0.0 | 0.0 |
| PT1 | 1214.6 | 895.6 |
| PT2 | 2914.6 | 895.6 |
| PT3 | 4514.6 | 895.6 |



PLANT SCHEDULE

| Plant | Botanical Name<br>Common Name | Total |
|---|---|---|
| | Aloe aristata<br>Aloe | 46 |
| | Carex buchanii<br>Carex 'Red Rooster' | 49 |
| | Cotyledon orbiculata<br>Cotyledon 'Silver waves' | 15 |
| | Crassula comans<br>Crassula 'Frosted Curls' | 14 |
| | Monstera deliciosa<br>Fruit Salad Plant | 12 |

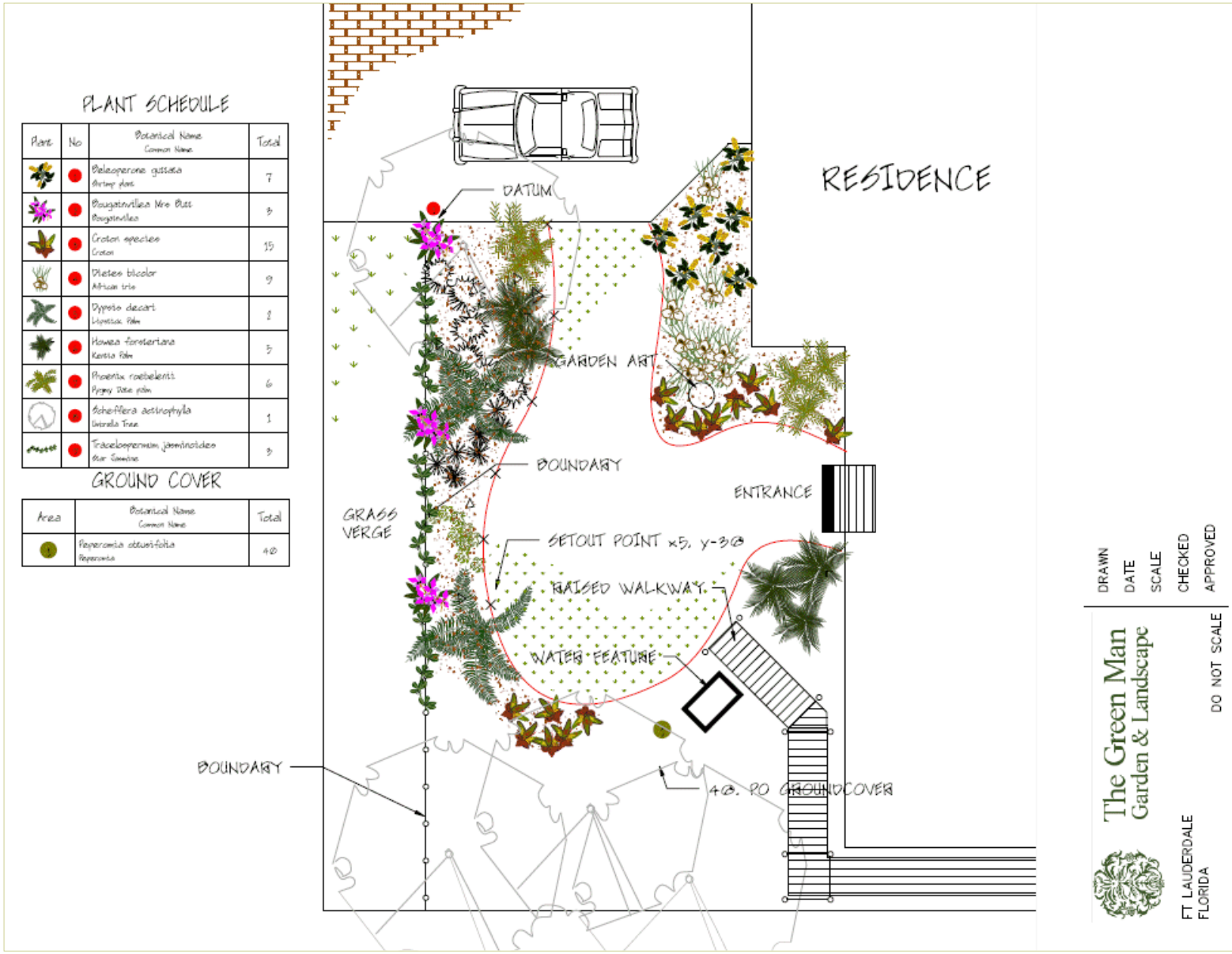
CLIENT:

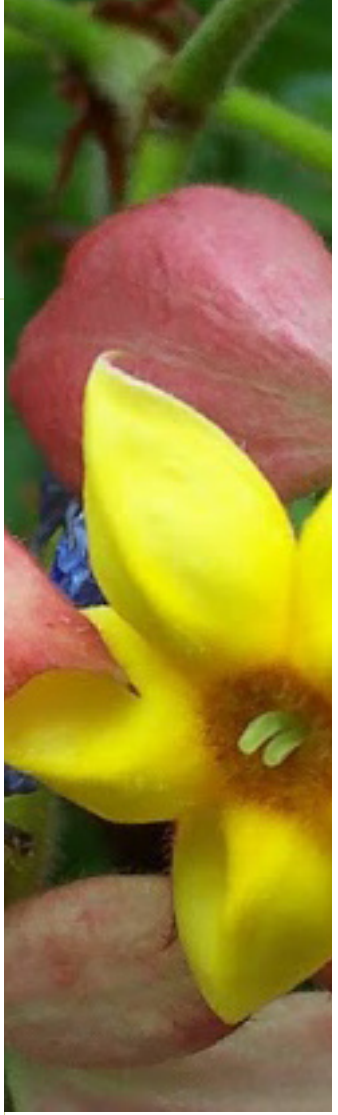


*Save construction time- accurately place design elements. Jewish memorial - Berlin*

## Work in either metric or Imperial units

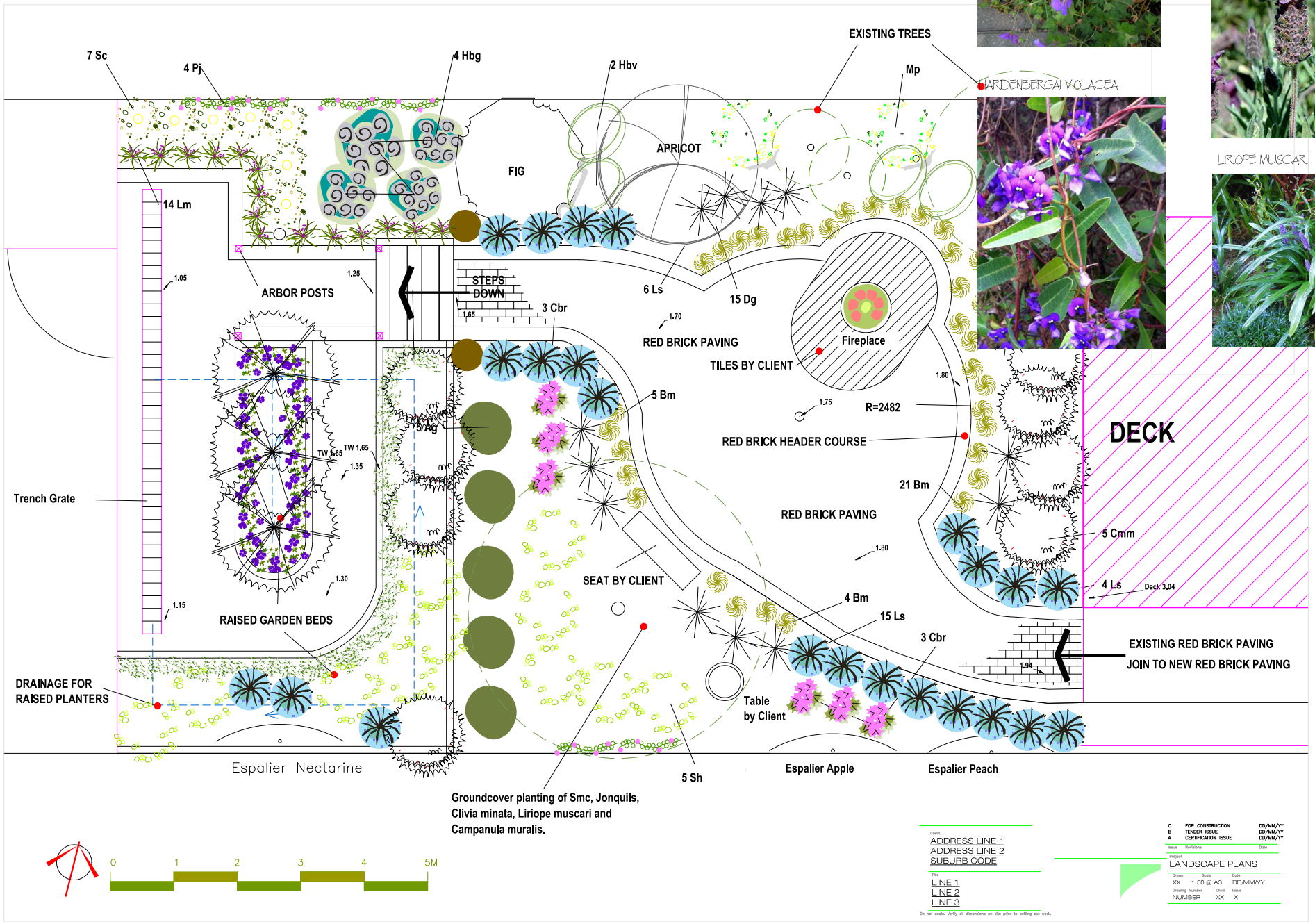
In gCADPlus, designers can work using either the metric or Imperial unit system using the same tools, so it is possible to o er design services around the world. Here is a design for a front entrance for a house in Fort Lauderdale, Florida USA developed by 'The GreenMan Landscape Designers' with decimal feet as the base drawing unit.



*Design for front of house - Florida, USA. Units are decimal feet. Design: Chris Maler.*

An example of some design work in the metric environment




GERANIUM ROZANNE

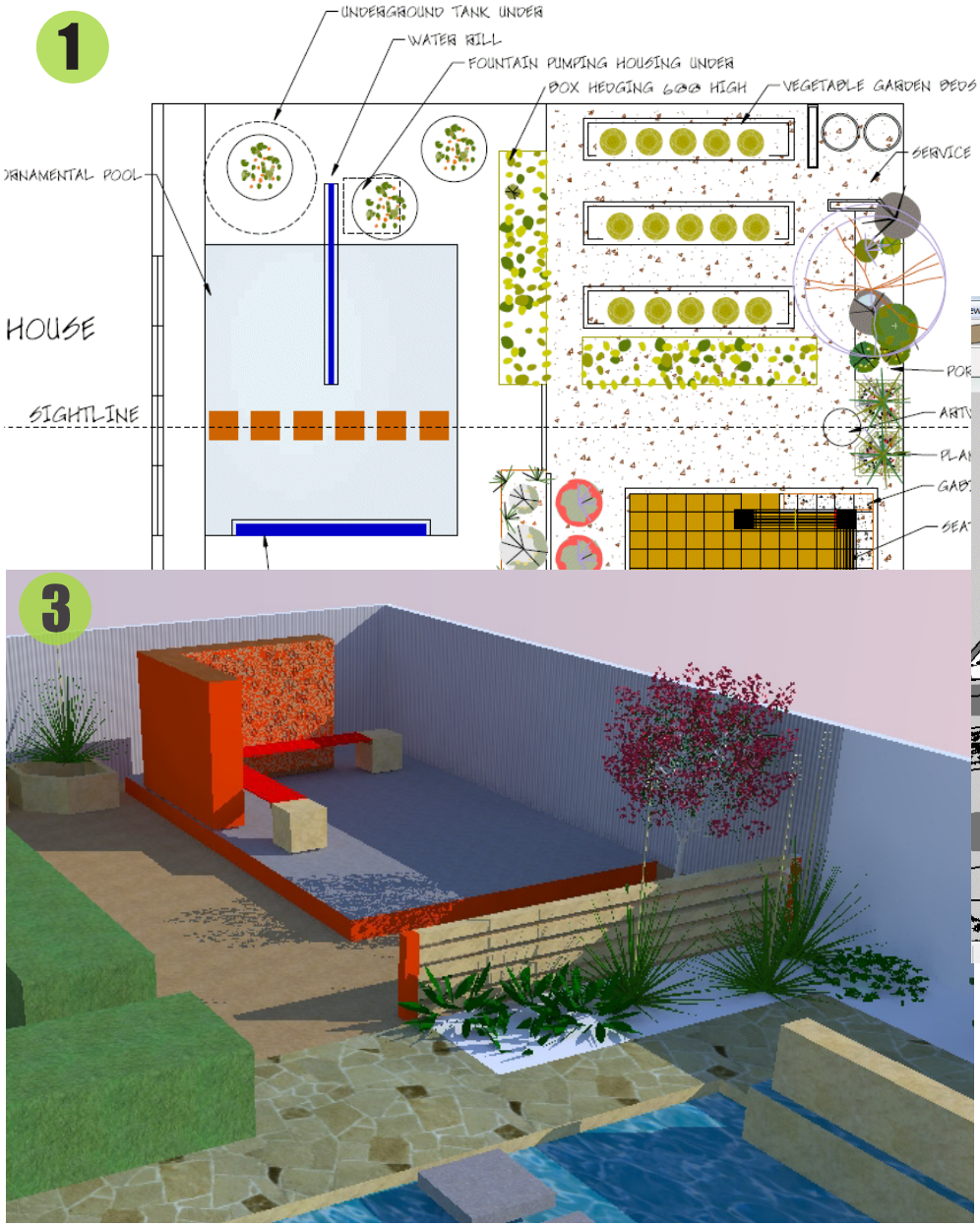
LAVANDULA STOECHAS

HARDENBERGIA VIOLACEA



LIRIOPE MUSCARI

Instead of meeting with clients over hand drawn plans and struggling to help interpret the design, it is now possible to deliver 3D models that allow the client to “walk though” the newly designed space. The process might start with a 2D plan such as the one shown below [1]




*From 2D plan to 3D model.*

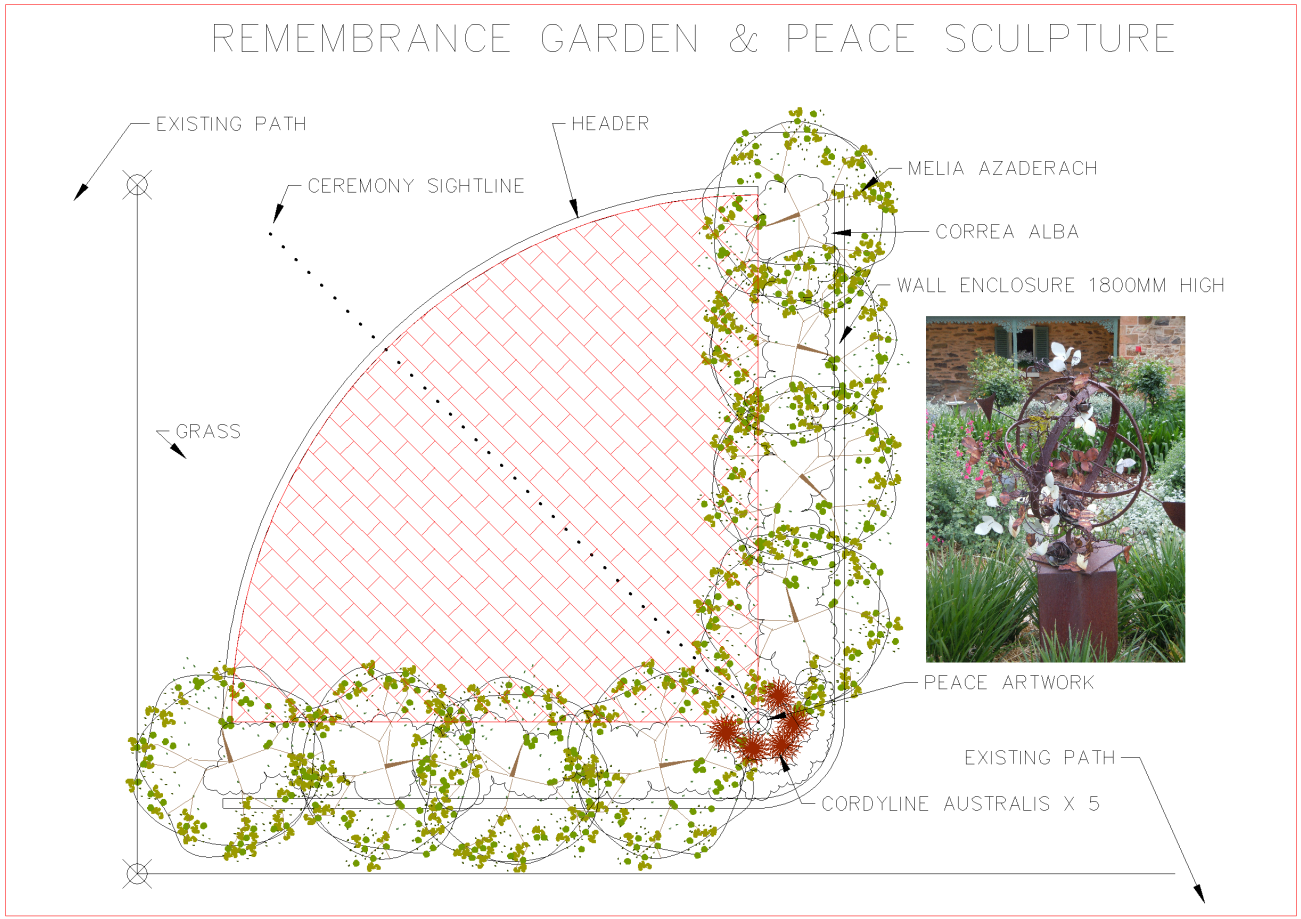
then pass to another 3D application - SketchUp and a 3D model created [2]. The SketchUp model might then be passed into another application for rendering and lighting and finally, the creation of an animation [3].

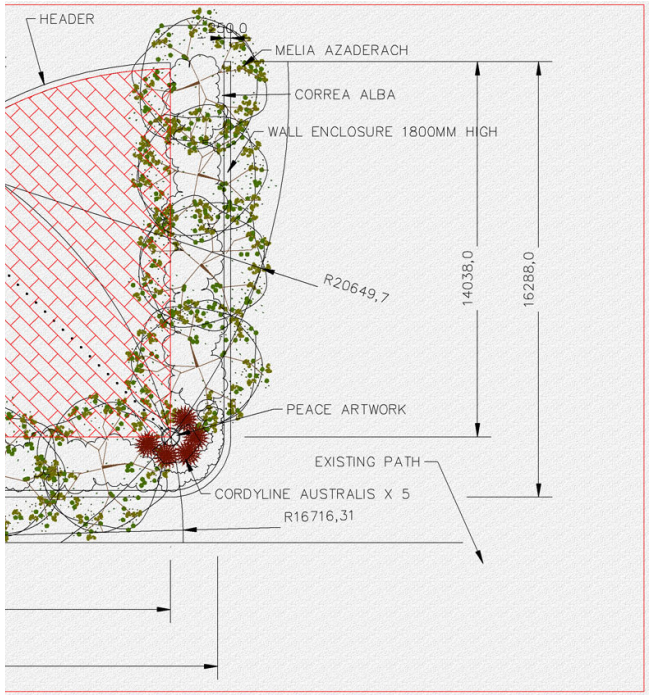
This 3-D model building and rendering ability helps clients interpret plans much more easily. Communication between client and designer improves as both gain valuable insights into how the constructed design will look. This computer based approach is much faster than preparing hand drawn perspective views.

Not only does the client benefit from the use of modern rendering and presentation software, but standard working drawings are produced much more e ciently. From a single CAD design drawing, di erent details can be given to the client and various members of a construction team. For example, a dimensioned 'hardscape' drawing, irrigation design, a lighting design and a colored version of the plan for the client.

## Dimensions

Designs can be accurately dimensioned. The two figures below illustrate this and show some plans for a remembrance section in a cemetery. The first figure (not a 3D view, but a quick 2D CAD plan) shows a view that the cemetery management committee saw while the second shows a print given to the construction team. Note that these views come from the same CAD design drawing (often referred to as the model).




*One model - plan and dimensions on different sheets.*

## CAD drawings can show panache

One of the common criticisms of computer generated landscape plans is that CAD plans lack flair and do not display the sort of individual character shown in hand drawn plans. That does not have to be the case. With just a little e ort, CAD drawings can certainly show personality.

The use of well drawn symbols, varying line weight, interesting hand lettered fonts, linetype settings, images of plants and construction details and careful use of color can all be used to reflect the personality of the designer. As shown by the figures at right, it is possible to add texture to CAD drawings. The design at the top right is drawn by hand, the bottom drawn using gCADPlus. Both by the same drafter.

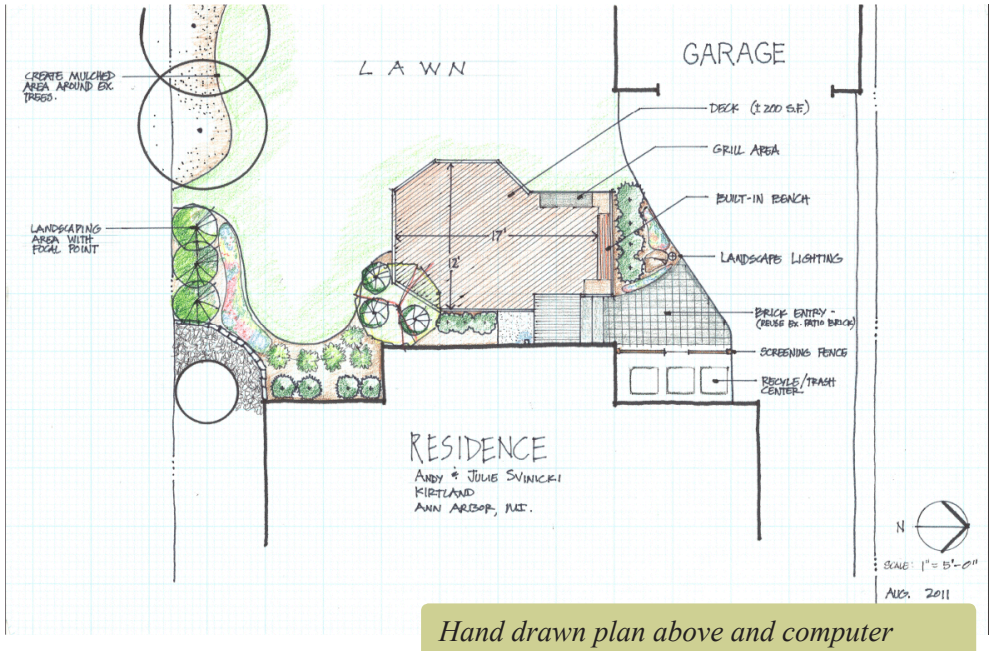
*Tip: The use of CAD does not preclude hand drawing. Many users hand color their gCADPlus plans for extra effect.*

## One file - many layout sheets

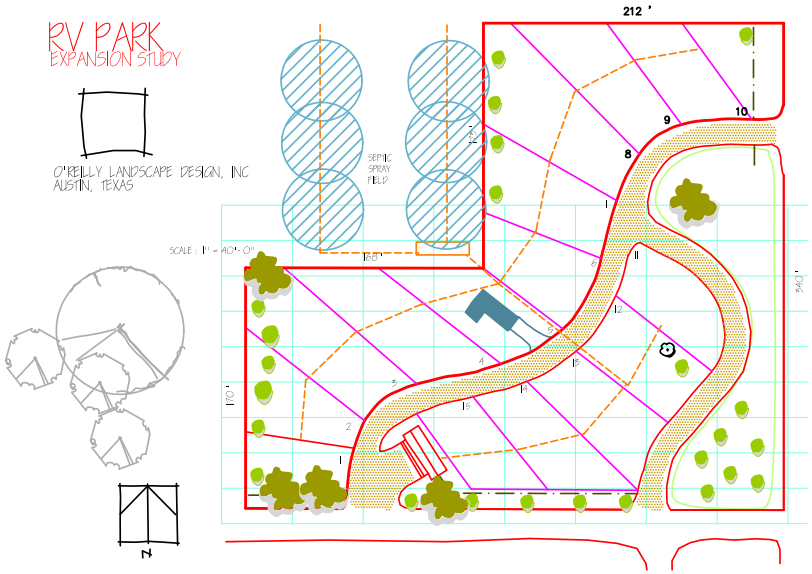
As mentioned, the same computer model is typically used to present the design on several sheets - there are lots of possibilities - sheets might hold:

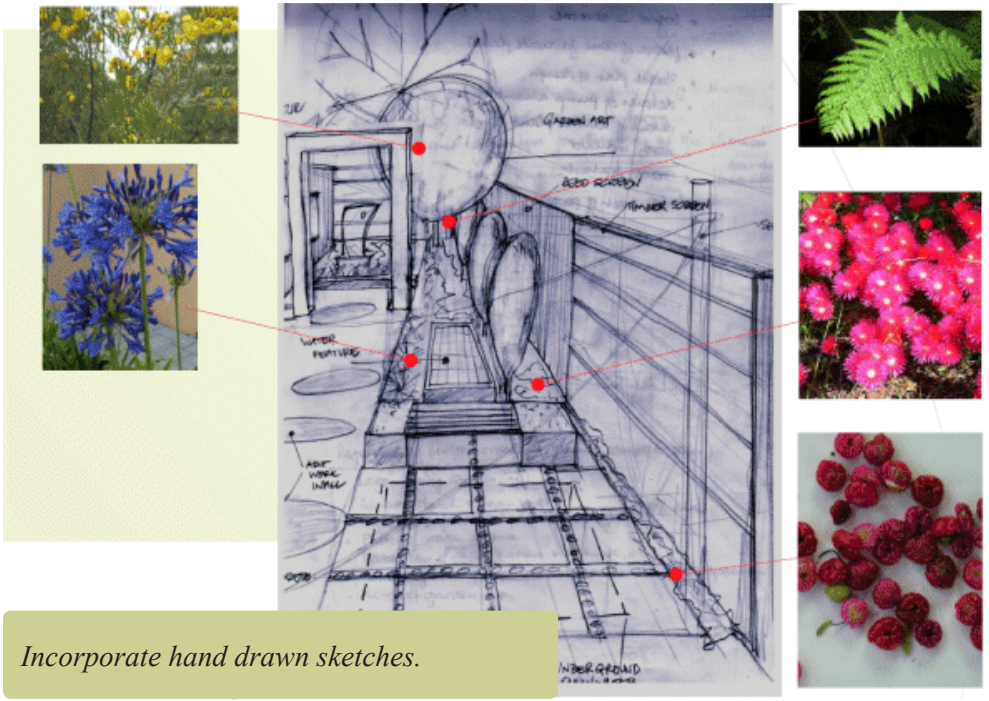
- A story board concept,
- The first detailed conceptual plan,
- A colored 2D presentation plan for the client,
- A detailed species list with information about supplier,
- A 3D model,
- A construction plan complete with dimensions,
- Irrigation and
- Lighting plan

All layouts can be generated from the same CAD file and without the need for any redrawing - a far cry from hand drafting. The figures below illustrate this.

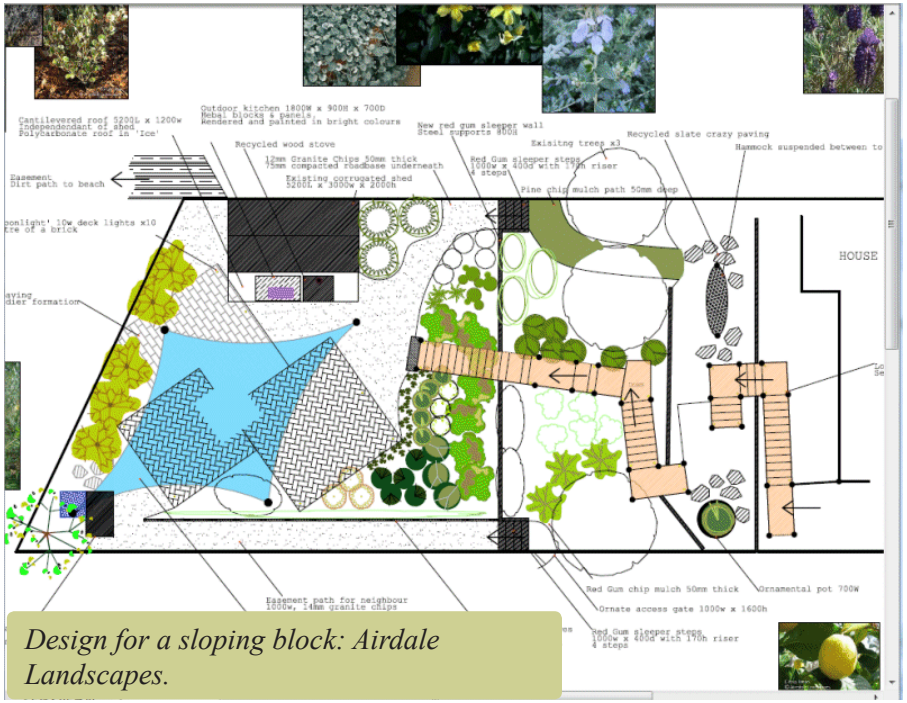



*Hand drawn plan above and computer drawn plan below. Both by Robert O'Reilly*

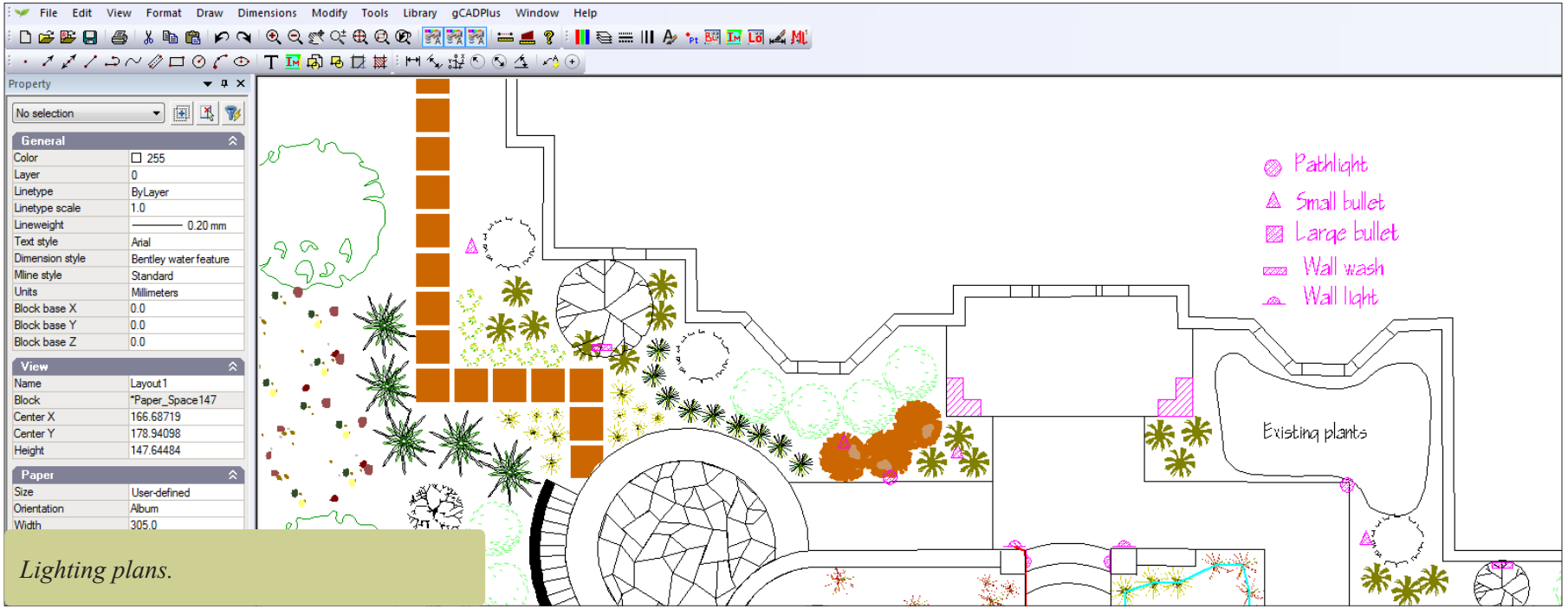




*Incorporate hand drawn sketches.*



*Design for a sloping block: Airdale Landscapes.*

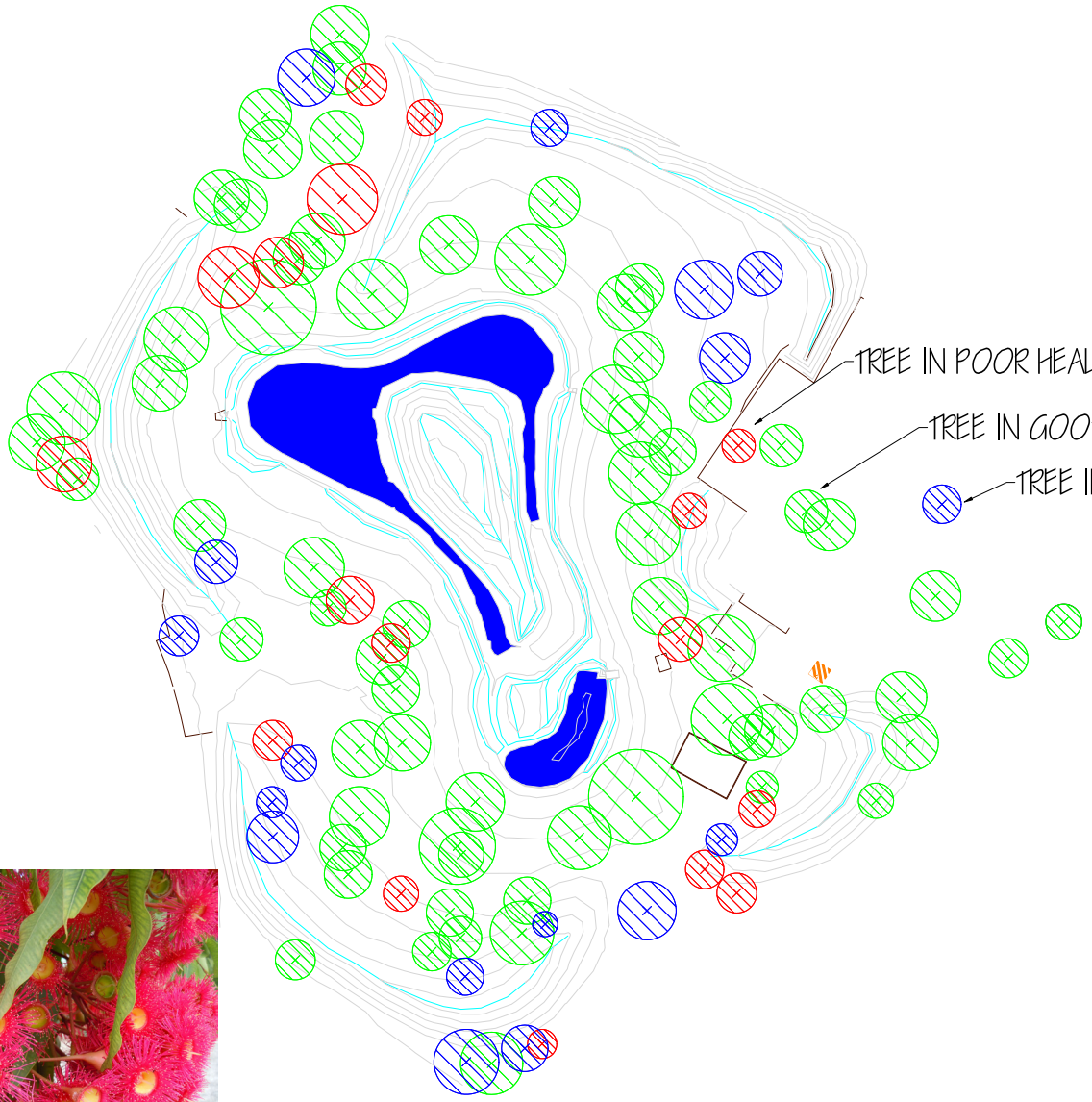



*Lighting plans.*

## Work on large sites

CAD software is not only used for small scale landscape plans, it can also be used in large survey work. The figure below shows data from field work in a wetland brought into a CAD drawing. This particular site is several hundreds of meters wide and the health of trees is automatically color coded as GPS data is loaded.

*Survey tree health with CAD and GPS - plot results - highlight trees for removal*




tree environs

CAD software such as gCADPlus would be a good choice if you were charged with the responsibility of managing an arboretum or botanic gardens. Aerial photos of the garden can be overlaid by gCADPlus data. Using the extended data tools, much additional information can be stored (Fig 1).

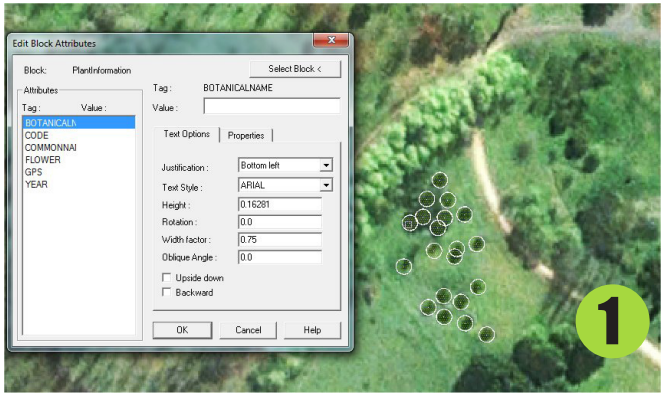
## Import GPS

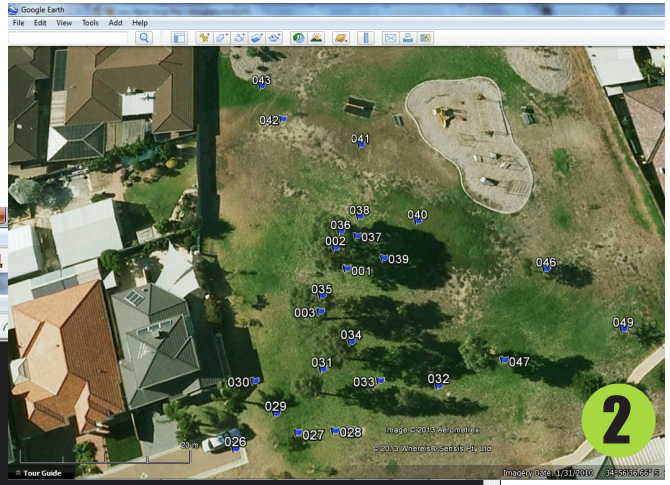
Data from hand help GPS equipment can be loaded straight into the gCADPlus environment (Fig. 2)

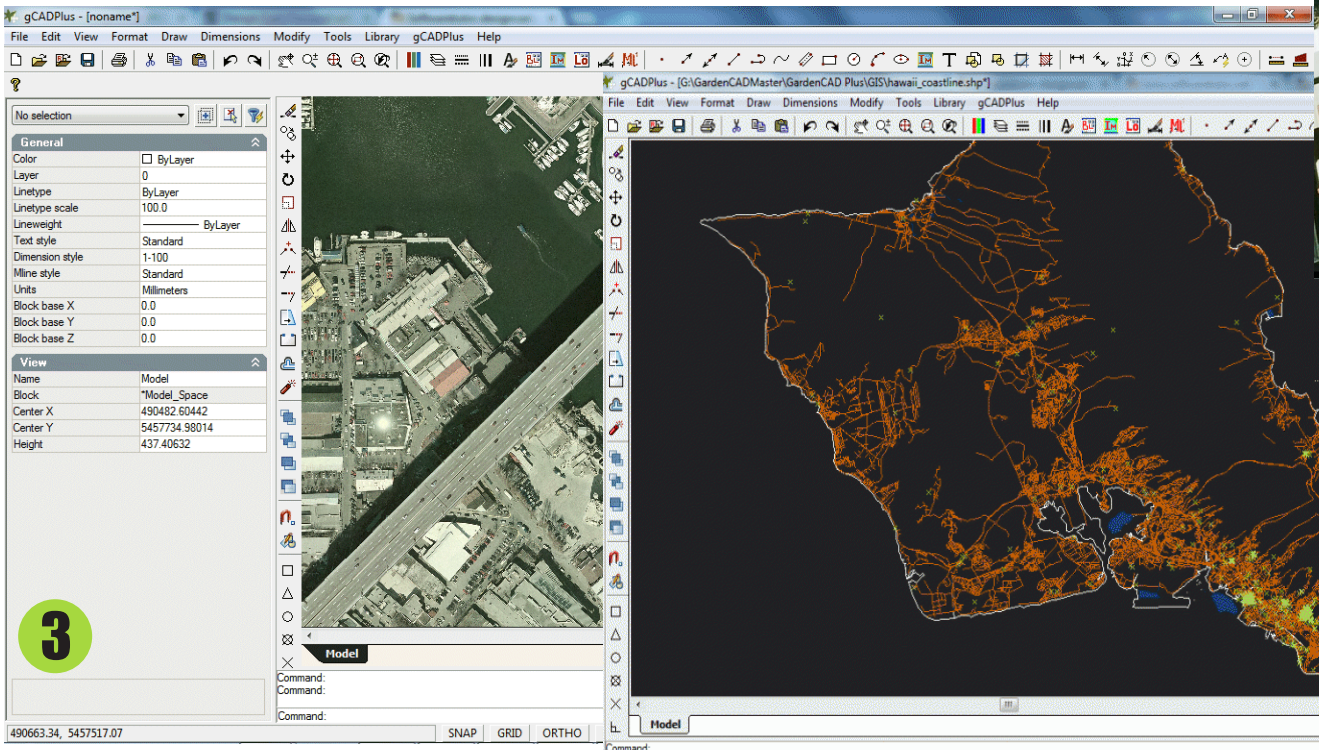
## GIS images - fast display

Aerial photographs can also be used as a base for gCADPlus drawings. Many show a high level of detail (especially those in .ECW format)  Figure 3 below shows a photo covering an area of the city of Vancouver displayed in the landscape design environment. This large ECW file loads in seconds.

Geographic Information Systems are designed to manage large stores of information and to tie maps to external databases. The figure below (fig 4) shows an example of GIS output (Hawaiian Islands) being viewed in gCADPlus software.  Landscape designers can take advantage of the large amount of maps and other large scale material available online.



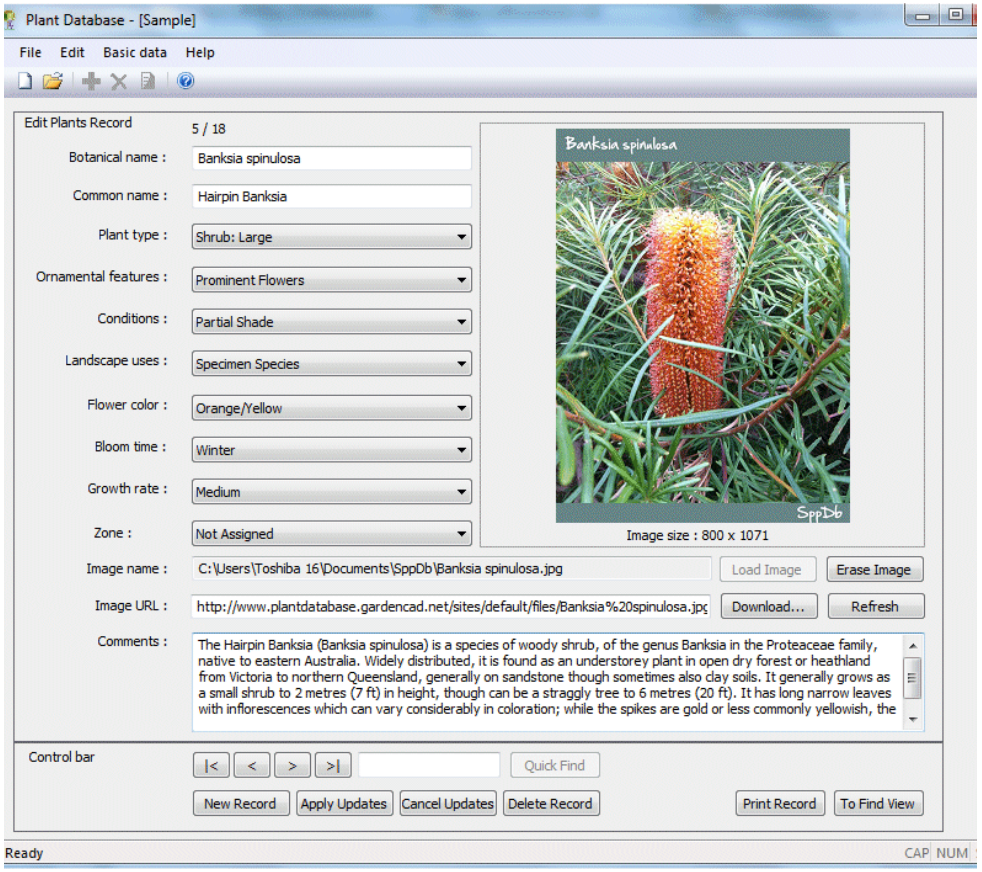



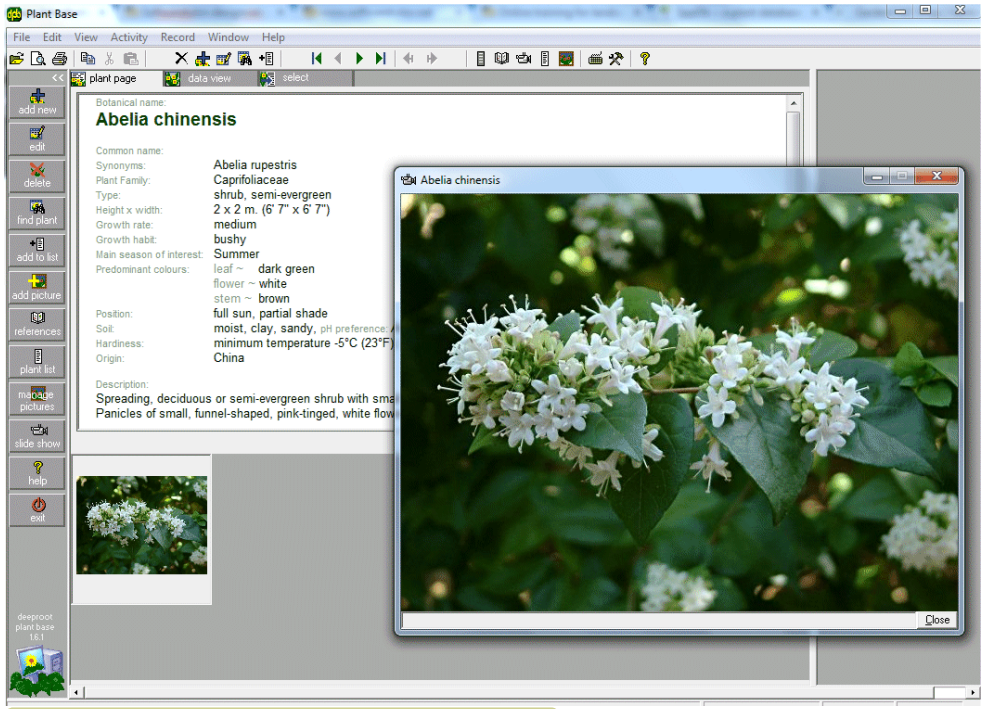
## Interacting with other software

Simple, personal plant databases such as that shown in the figure at right can aid plant selection while drafting with gCADPlus. Designers often populate a personal plant database such as this with species of plants with which they are familiar and the database application enables retrieval of lists of plants for particular applications. For example, a designer might ask for a list of all small trees, suitable for frost prone areas which have pink flowers in winter. Even though a designer may indeed know the plant once their memory is jogged, most designers find it di cult to quickly recall this type of information from their own 'memory' bank. Once located, the image can be imported onto a layout sheet to show the client something about the particular species.

If more detailed information is required, databases holding the details and photographs of thousands more species can be used by landscape designers.



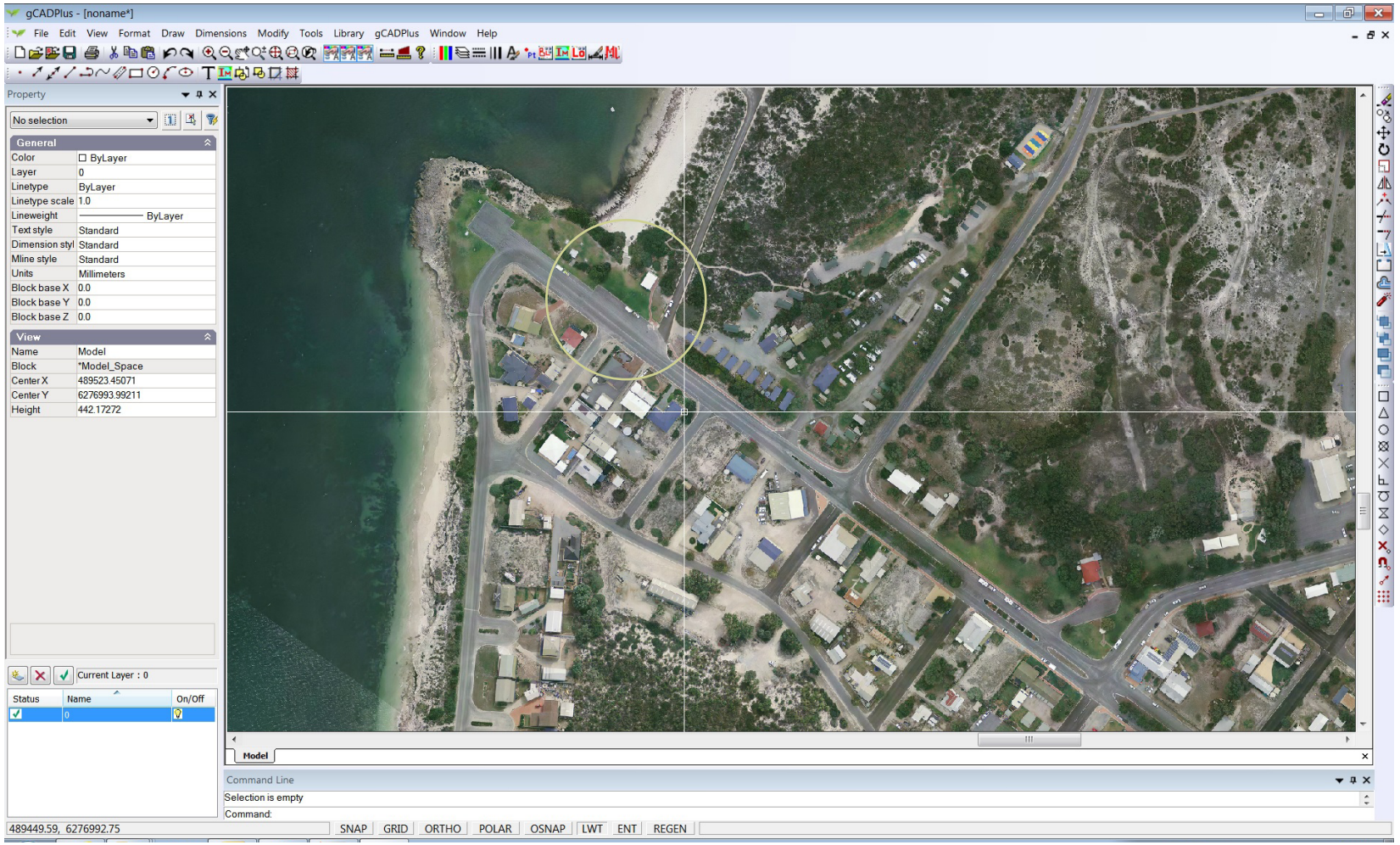

*Use a personal plant data file to store information about the species a designer works with. Filter the list an export a sub set to CAD software.*




*Use online databases containing thousands of species.*

## Using aerial survey work as a base for a landscape plan

Increasingly, landscape designers are being asked to use aerial photographs as a base for design work. Many of these image files are very large. Standard CAD software often struggles to display and mange them. The figure below shows an example from an aerial survey of part of the coastline from and Australian state. the file is a massive 1.5 Gig in size yet displays quickly. It is possible to zoom in on small parts of the photograph and use it as a base for design work.

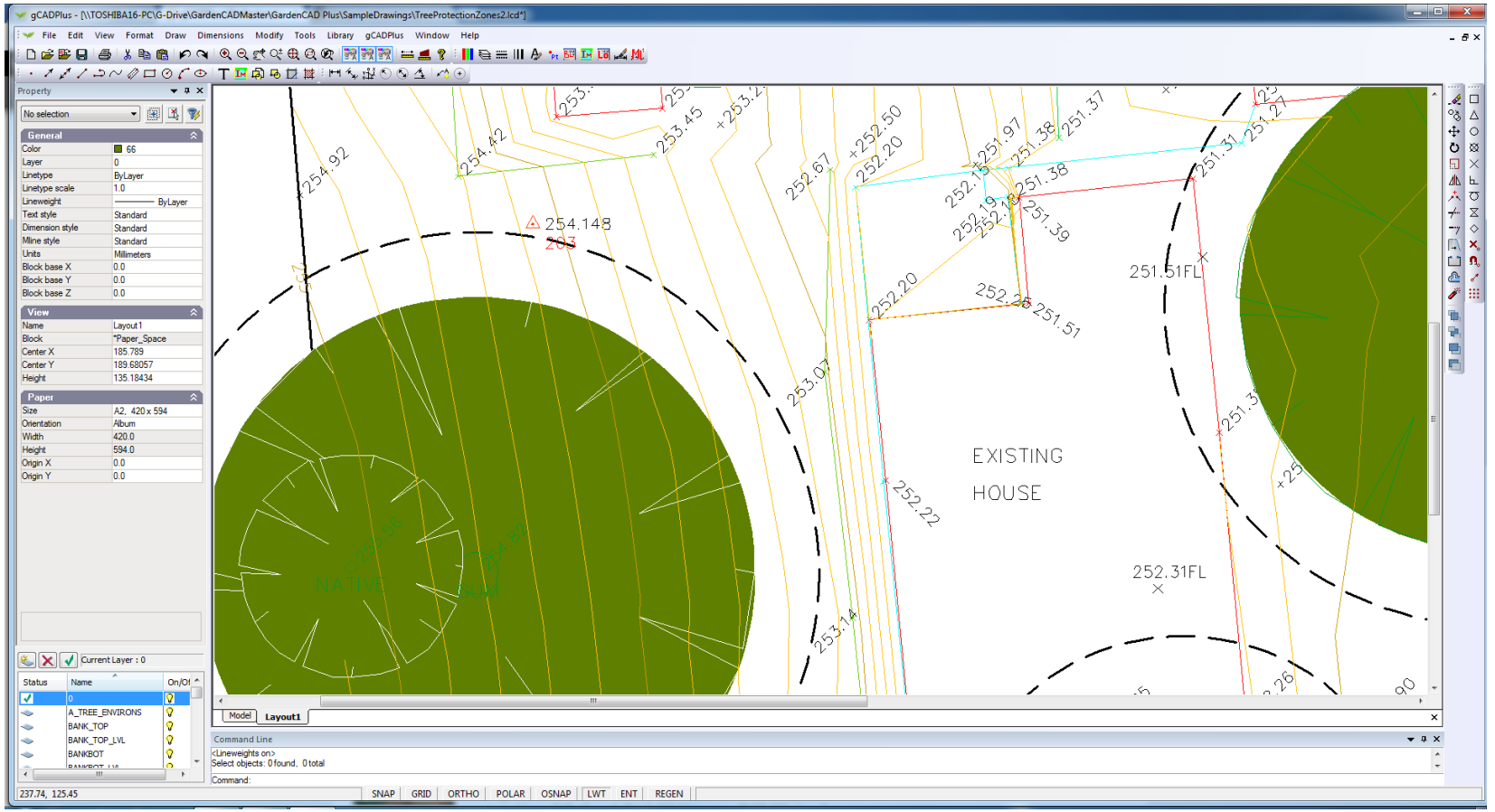



*Here a very large, high-resolution aerial photograph of part of the South Australian coastline loads and displays in seconds in gCADPlus and displays the correct MGA coordinates. The file is 1.5 Gig in size!*

Magnified view of coastal fringe taken from the image above. A survey plan (with contours) and position of trees to be retained are plotted on the drawing which is a combination of raster information, the aerial photography and vector, the CAD information. Note the contour information on the steps leading to the beach.

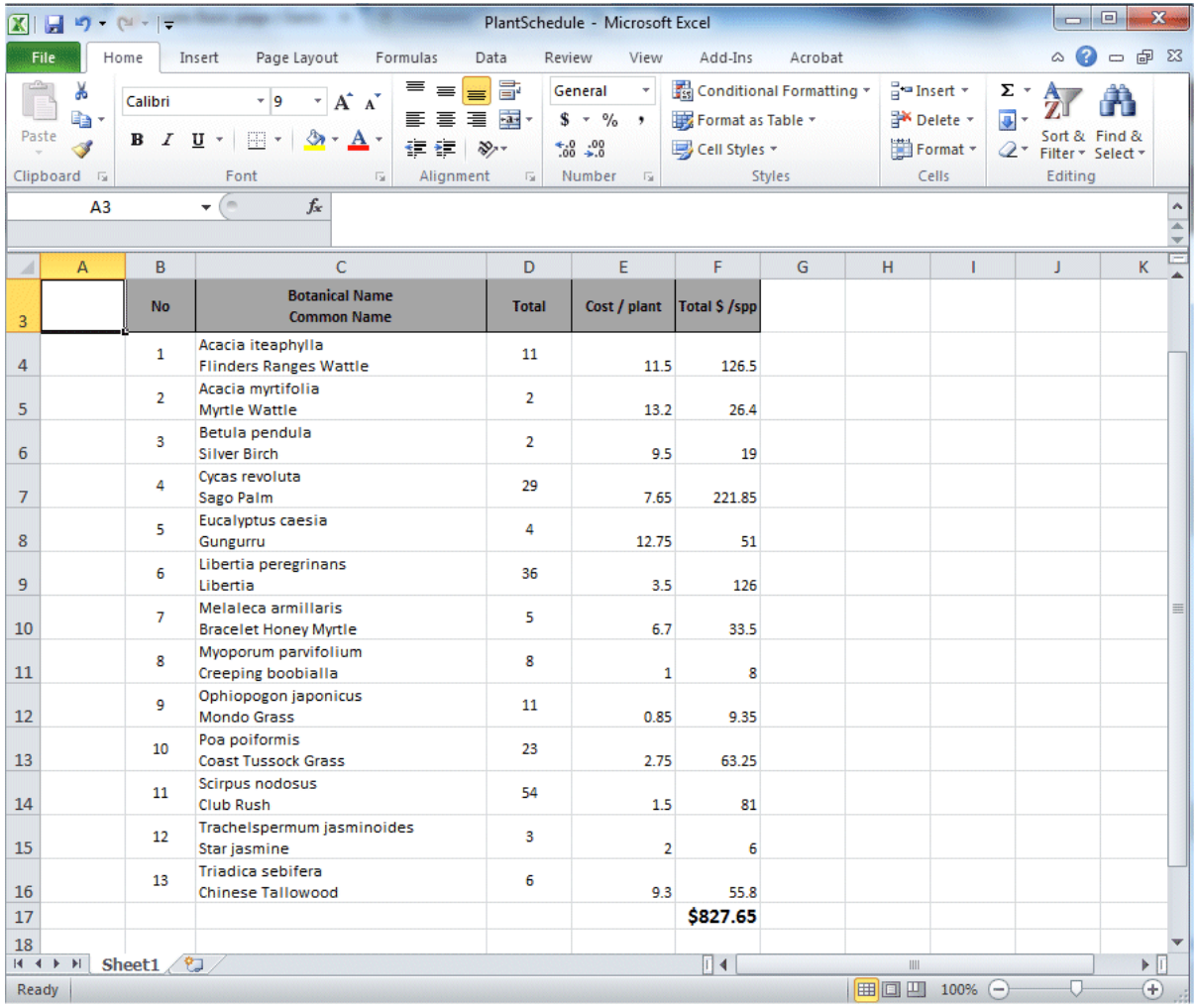

*Hybrid drawing containing raster and photogrammetric vector information.*

Layers and linetypes associated with those layers can be used e ectively by arborists.The dark green area represent the actual tree canopy of a number of significant species on site. A tree exclusion zone has been calculated for each an represented by a black dotted circle. An arborist has indicated that any new development should stay outside that zone. gCADPlus is used to clearly demonstrate location of the tree exclusion zone.



## Costing design work

A CAD drawing is much more than a simple plan. Because the model constructed in the computer is full size, quantities can be taken from the design itself. The number of plants of each species required to construct the design, the total number of ground cover plants required, volumes of much, areas of paving and much more can all be extracted and passed to spreadsheets for further manipulation.



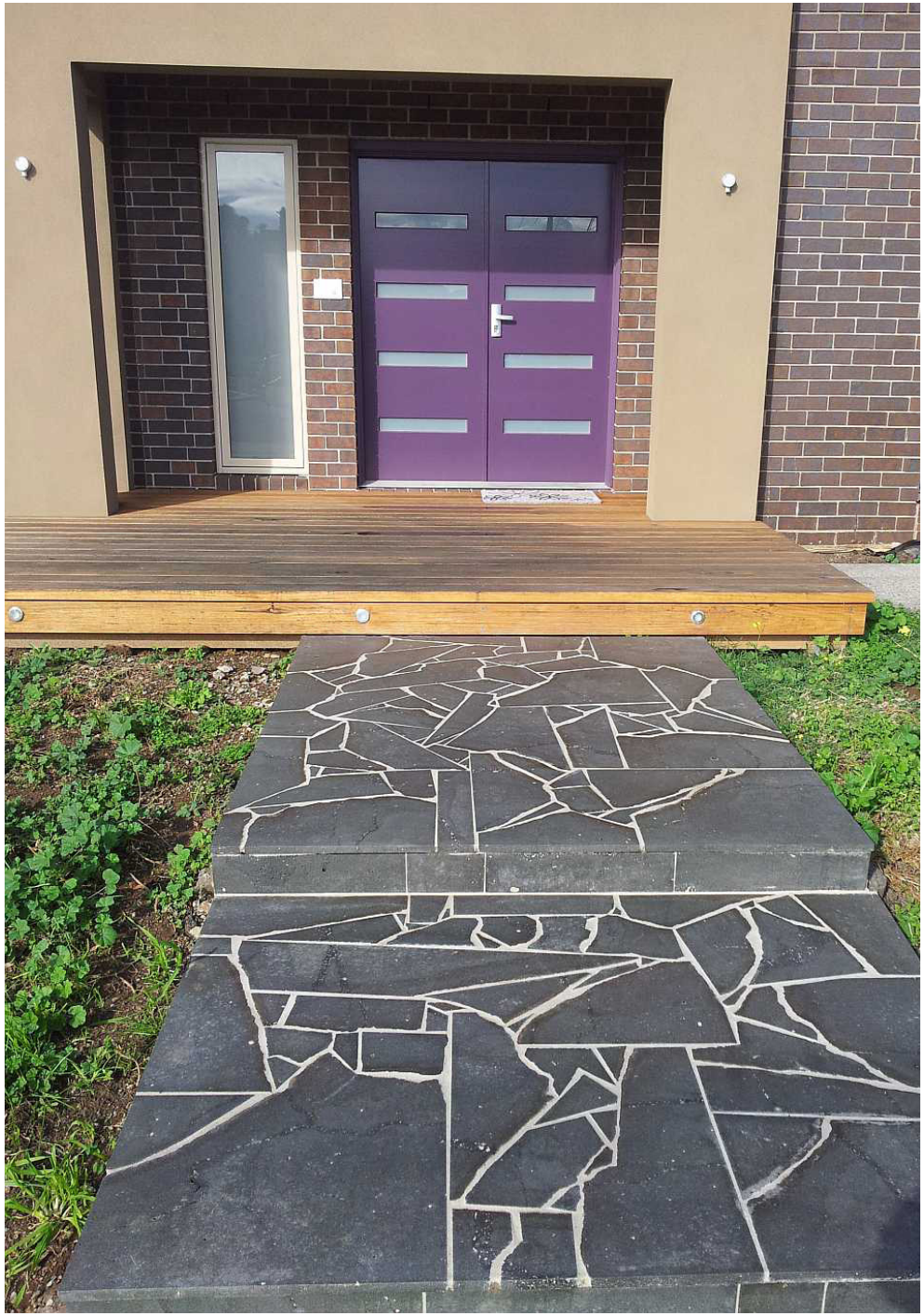

| | No | Botanical Name<br>Common Name | Total | Cost / plant | Total $ /spp |
|---|---|---|---|---|---|
| 4 | 1 | Acacia iteaphylla<br>Flinders Ranges Wattle | 11 | 11.5 | 126.5 |
| 5 | 2 | Acacia myrtifolia<br>Myrtle Wattle | 2 | 13.2 | 26.4 |
| 6 | 3 | Betula pendula<br>Silver Birch | 2 | 9.5 | 19 |
| 7 | 4 | Cycas revoluta<br>Sago Palm | 29 | 7.65 | 221.85 |
| 8 | 5 | Eucalyptus caesia<br>Gungurru | 4 | 12.75 | 51 |
| 9 | 6 | Libertia peregrinans<br>Libertia | 36 | 3.5 | 126 |
| 10 | 7 | Melaleca armillaris<br>Bracelet Honey Myrtle | 5 | 6.7 | 33.5 |
| 11 | 8 | Myoporum parvifolium<br>Creeping boobialla | 8 | 1 | 8 |
| 12 | 9 | Ophiopogon japonicus<br>Mondo Grass | 11 | 0.85 | 9.35 |
| 13 | 10 | Poa poiformis<br>Coast Tussock Grass | 23 | 2.75 | 63.25 |
| 14 | 11 | Scirpus nodosus<br>Club Rush | 54 | 1.5 | 81 |
| 15 | 12 | Trachelspermum jasminoides<br>Star jasmine | 3 | 2 | 6 |
| 16 | 13 | Triadica sebifera<br>Chinese Tallowood | 6 | 9.3 | 55.8 |
| 17 | | | | | $827.65 |

*It is possible to extract information such as numbers of plants required to implement a landscape design by exporting data to spreadsheets for costing.*

These are just some of the ways in which computer applications can help the work of landscape designers. We hope to have stimulated some interest in learning to apply gCADPlus to your next landscape project.

*Download a free copy of gCADPlus from http://www.plus.designcad.com.au and use it in demonstration mode.*

*A Newari style garden in Nepal with a contemporary edge by Ross Uebergang. Building walls out of recycled brick. Features an outdoor bath out of copper in the shape of a giant leaf. Utility spaces and a lot of plants. The whole is constructed using second hand materials where possible..*



*Make area and volume calculations inside gCADPlus drawings.*