

Rammed earth winery

Wines of individual character and finesse need a building of matching elegance.

BY LYNDA WILSON

Andrew Margan's family has been involved in the Hunter Valley wine market since the 1960's when his father, Frank Margan, established the De Beyers vineyard in Pokolbin. After a number of vintages under master winemakers, Andrew, along with his wife Lisa, started Margan Family Winegrowers in 1997. They now have over 100 hectares under vines, with the heart of the business located in a magnificent rammed earth building.

Design considerations

The building requirements called for a number of separate but connected areas: barrel hall, restaurant, tasting room, offices, and a large courtyard. A Mediterranean style was the preference, with rammed earth the wall material of choice. Andrew had visited other rammed earth buildings and always liked their quiet permanence. The vineyard had already been planted, and council requirements stated that the building had to be at least 50 metres from the road, so some minor space restraints were imposed.

Lisa and Andrew drafted their design concepts and passed these on to building designer Quin Wyatt to complete.

The first draft was of a total building area over 500m², which would have resulted in an additional set of council requirements governing fire regulations coming into force. So Andrew and Lisa sat down with the staff and decided exactly what they wanted and where, while reducing the overall dimensions and still retaining the original design elements.

Even though he was busy running the vineyard, Andrew decided he would still like to be an owner builder. He would not be involved on a day-to-day basis with the physical building work, but he felt it important to maintain control over the project. This was especially important as they would be building in stages, as and when funds became available to complete each section.

Build details

The walls were constructed by China Walls Stabilized Earth in stages over a period of six months. They were chosen as they had a good reputation, and most importantly were prepared to travel. The work was performed by a team of 3-4 builders at a time. Lifts of 600mm were completed, and then left overnight before the next lift was

done. Freestanding wall sections were completed and left to cure for two days before an adjoining wall was started. All panels were formed up on site according to the desired shape. Gravel from the local Broke Quarry was used, mainly for its white/yellow colour. This was mixed with a small percent of coastal yellow sand to add some depth of colour along with cement for stability and silicon for durability.

The concrete slab was laid by local concreter Kerry McCreddis. Extra aggregate was added to the mix so that the final cut and polished floor would provide a natural looking finish to complement the earth walls. This work was hampered by heavy rains, meaning large areas had to be cleared of sludge before the slab was poured.

Local builder Graham Walker was called in to construct the roof and verandah frames. The traditional slate-look roof tiles continue the theme, with Italian copper guttering and downpipes providing a striking architectural feature.

Once built to lock up (after about 18 months), the office wing was then fitted out followed by the tasting room and restaurant. Lisa Margan designed





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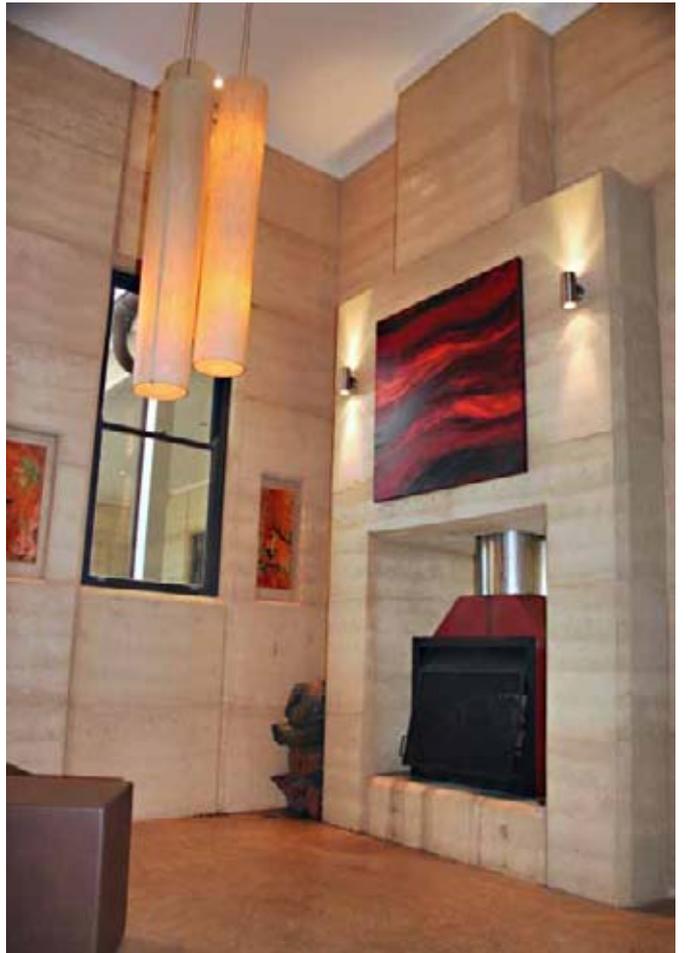




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the interior fit out and worked in collaboration with Newcastle-based landscape designers Urban Exotic to complete the landscaping of the entire complex. The restaurant and tasting room was opened to the public in 2007.

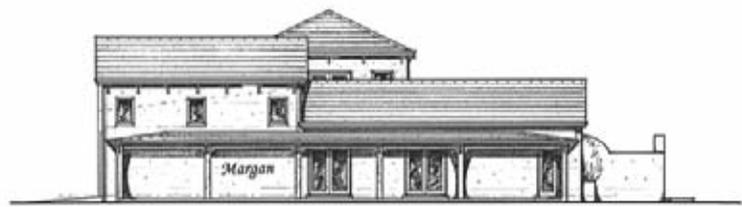
Aesthetics

The rammed earth bar support in the tasting room was constructed with a striking 'terra rossa' (red earth) streak undulating along its length. The idea was to replicate the surrounding mountain ranges that ring the Broke Valley. Nature played havoc with the design when heavy rainfall soaked the freshly formed bar wall (the roof was not constructed at that point) and caused the clay pigment in the red earth feature to create drip lines. Whilst this caused major panic at the time, it has now become a wonderful feature of the bar! The timber bar top was handmade by local craftsman Paul O'Toole, using recycled wandoo (*Eucalyptus wandoo*) from a redundant Mudgee bridge. The timber was so heavy that the bar top had to be built in situ. Artwork is by Sydney based artist Esmeralda Wood and was specially commissioned for the building.

The barrel room is the ultimate triumph - all walls are rammed earth, with lots of insulation between the roof and particleboard ceiling, so it easily maintains a constant temperature. However, a new barrel room may soon need to be built, as this one has become a very popular venue for wedding receptions.

The commercial kitchen is fitted out with stainless steel fittings. The cupboard doors facing into the restaurant, as well as the huge double doors opening onto the barrel room, are of timber construction but have been dipped in copper and a patina applied to create an aged metal appearance.

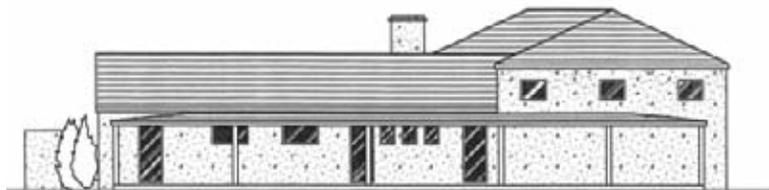
One of the exterior office walls was built with conventional timber frame and weatherboard. This was due to the fact that this wall incorporates a door and two large windows. While the internal walls of the office are plasterboard, there is nothing 'ordinary' about them - they have been given a black undercoat and then finished with a Porters Paints 'rust' top layer. A fused formed glass window incorporates the Margan logo.



East elevation (concept)



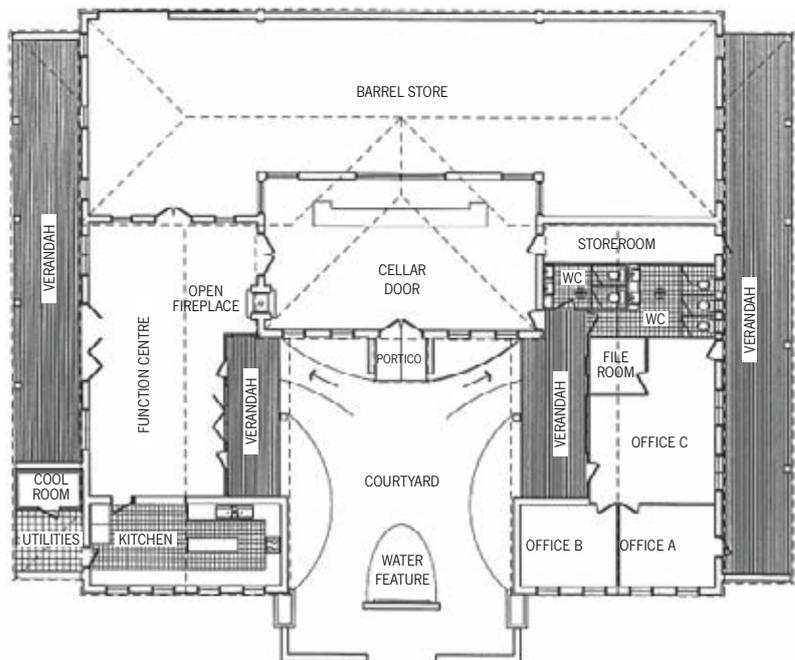
North elevation (concept)



West elevation (amended design)



North elevation (amended design)



Floor plan

PLANS: QUIN WYAT

Technical information on stabilized earth walling

...provided by China Walls Stabilized Earth Pty Ltd

Strength

Wall strength is measured according to its compressive capacity (downward resistance to pressure). The compressive strength of stabilized earth walls vary from 3.5 MPa (megapascal loading) to 12.0 MPa. This compares favourably with double brick walling using 20 MPa bricks together with 6.7 MPa mortar. The density of stabilized earth walls varies from 2.0 to 2.2 tonnes per cubic metre.

Wind loadings

Vertical uplift loads caused by high winds are carried by building hold-down bolts into the stabilized earth walls to depths required. The density and mass of the walls helps considerably with resistance to these loads.

Lateral wind forces are carried in the conventional way by integrating support from roof, floor and intersecting walls.

Contemporary stabilized earth buildings can be engineered to Australian Wind Code AS 1170, which allows for a Basic Permanent Windspeed of 70 m/sec.

Contemporary stabilized earth buildings can be engineered to Earthquake Code AS 2121, suitable for Seismic Zone 2.

Materials

A range of materials can be used in the composition of stabilized earth walls, including; limestone, sandstone, gravel blends, and recycled materials such as crushed clay brick and concrete rubble. Locally sourced materials may be appropriate for projects distant from the manufacturing centres, while recycled brick rubble is especially suited to urban applications.

Thermal properties

A 300mm thick stabilized earth wall provides a more effective thermal mass than any other comparatively priced wall system.

Thermal mass describes a material's potential for storing thermal energy. The CSIRO gives 150mm thick masonry (or rammed earth) a C-value or thermal capability of 300, compared



to an insulated timber/wallboard clad frame that has a C-value of 12.

If the building is designed with effective passive solar principles, this contributes to a unique thermal comfort zone that in winter stores heat during the day to release it during the evening, and alternately during the summer carries the cool of the evening well into the day. A climate-sensible design that harnesses the 300mm thick stabilized earth wall system provides cost-effective, energy-efficient comfort.

Stabilized earth walls are now used in large commercial projects for this reason, saving many thousands of dollars on heating and air conditioning, as is otherwise the case with buildings designed using purely R-value insulation principles.

Certain design considerations will maximize the benefits of your stabilized earth walls; ask for advice with regard to appropriate design.

Insulation

Insulation regulates the movement of heat. The energy stored in thermal mass can be contained and controlled using insulation. The R-value of earth walls is not high, as heat is transferred slowly through the material. The thermal lag effect together with the high thermal capacitance of earth means that earth walls in a well designed building will give much greater comfort than the same building with lightweight insulated walls. The academic debate on this subject is slowly catching up with the reality as more sophisticated testing of building performance and resultant computer modelling is added to simple testing of samples of different materials. The NSW Sustainable Energy Development

Authority (SEDA) Smart Homes Program for rating the energy efficiency of residential dwellings evaluates them using their Energy Smart Scorecard. This program rates earth walls as the highest for both the thermal mass and insulation, with earth wall houses employing basic passive solar design features achieving 5 star rating.

Embodied energy

Embodied energy is a measure of the total energy cost of a material placed in a building including all stages of extracting raw materials, processing, transport, placement, finishing. A low rating is a good rating, environmentally, but must be related to the life and performance of the material. Stabilized earth walls are rated at 405MJ/m² (5% cement stabilizer). 150mm pre cast tilt up concrete is rated at 818MJ/m², and clay brick cavity wall at 860MJ/m².

Fire resistance

A 1986 NBTC (National Building Technology Centre) Fire Resistance test carried out to AS 1530.4-1985 on a 300mm thick stabilized earth wall resulted in a four-hour fire rating.

Acoustic properties

Stabilized earth walls are an effective device for reducing airborne sound transmission and impact sound vibration. The rating system used for sound insulation is the Sound Transmission Class (STC). An STC of 57 was derived from a 1986 NBTC test on a stabilized earth wall. As comparison, a 140mm solid concrete block wall has a STC of 45.

Termite treatment

Combined with a concrete raft slab, a non-cavity stabilized earth wall will provide a barrier to termite access. The Australian Standard AS 3660 for termite control will allow for the use of design as a non-chemical termite control. In the event of an outbreak the ants presence would be clearly visible on the wall face, facilitating early detection and treatment. ■



PHOTO: MARGAN ARCHIVES



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Laser cut 'aged' metal screens were added to the courtyard, tying in well with the genuine French-Moroccan wrought iron gates that guard the entrance to the tasting room. These gates had been in Andrew and Lisa's possession for a long time, intended as a key piece of the final building. They influenced many elements of the design and material selection.

A flock of metal grazing birds appears to move over the lawn in front of the restaurant – these were a surprise find at a local art show, by Dubbo artist Norman.

Essentials

Water is supplied by water tanks and dams, with filtered drinking water provided in the restaurant. An *Envirocycle* waste water system allows for processed water to be used on the trees in the garden. Power is grid-supplied, with a backup generator (essential for the winery). An electronic touch-system was installed for all light switches. Conduit was included in the rammed earth wall formwork for running of electric wires, especially necessary in niche areas for the lighting of artwork. Power points have their wiring concealed behind skirtings. Individual ducted airconditioning to each area means that not all units have to be on if an area is not being used.

The resulting building is far more than a working winery – it is a beautiful and peaceful space reminiscent of the Mediterranean. Why not visit the tasting rooms and pop in to the restaurant for a great meal? ■

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• China Walls Stabilized Earth

Specialising in the construction of stabilized earth buildings.
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www.chinawalls.com

• Penelope Beveridge

Penelope Photography, 0415 559 146,
www.penelopephotography.com

• Building designer

Quin Wyatt, 0418 589 461,
qwyatt@bigpond.net.au

• Kirumba Roof Tiling

Supplier of CSR *Wunderlich* Nullarbor roof tiles in Slate Grey for the winery. Newcastle NSW. 02 4956 1744,
www.kirumba.com.au

• Craft Metals

Copper guttering and downpipes.
02 9482 4166, www.craftmetals.com.au

• Paul O'Toole

Mottys Antiques, Broke. 02 6579 1119

• Esmeralda Wood

Esmeralda Wood is Art Director of Drink Australia. 02 9565 2566,
esmeralda@drinkaustralia.com.au

• Axolotl Group

Axolotl Ozone – fused Margan windows.
Axolotl Metal – finishing on kitchen cupboard and barrel room doors.
02 9666 1207, www.axolotl-group.com

• Envirocycle

A unique system developed specifically to recycle domestic and commercial wastewater.
1800 688 588, www.envirocycle.com.au

• Vaughn & Monaghan

Insurance during build.
02 9476 2988, www.rjvm.com.au



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