

# Ecolodge Build Update November 2018

**From Sept 2019** it all got so busy that I limited my record of the changes to [this page on Facebook](#)

Our design aims to provide a comfortable, healthy living environment with minimum energy use both during the period of construction and more crucially during the lifetime of the building. It is during its lifetime that our design will create the greatest saving. Our design obviates the need for heating and air conditioning, lighting during daylight hours and electrically operated fans.

We have been able to minimise the energy used to create the building (embodied energy). Most of the of the materials that we are using are local and hence require little transport. Here are some examples:

**1) These materials required very little energy indeed to produce**, most energy arising from transport over a short distance:

a) geological resources: aggregates; stone paving; earth quarried from the building site itself or “waste” from a project a kilometre away to make the rammed earth walls.

b) biological resources: used for beams, ceilings and shading (cypress, eucalyptus and “bamboo” – actually *Arundo donax*).

**2) These materials used more energy to produce will only be used where necessary:**

a) geological resources which have been processed: cement (which, although it produced locally using lime-rich rocks from the Anti Atlas Mountains, uses huge amounts of energy to produce it) and steel. Both of these are, of course, essential structurally, but we shall use them minimally to meet building regulations eg for ring beams at roof level, for foundations and for rooms with a width over over 4 metres.

b) biological resources: the wood for windows and doors is imported. We will protect the wood by shading and with good quality microporous paint to ensure they last well.

**Below is a video link showing the builders at work in mid-January 2019.**

The main focus of the video is **rammed earth construction**, the method used to build both Taroudant’s Town Walls and massive aqueducts (both built in the late 16th Century) when Taroudant was the capital of Morocco and sugar production from cane was an important local industry; it was even supplied to Queen Elizabeth 1 who would eat no other!

The aqueduct (much still standing) was one of the Seven Wonders of the World. The method and material is sustainable – the earth is derived from a

local source; it lasts for centuries if it is correctly plastered and the roof top (chapeau) is maintained; it produces comfortable living conditions due to its ability to moderate temperature and humidity inside the building AND it looks and feels so organic, which, of course it is! It uses and helps to sustain centuries-old skills of the local Berbers. We want to be a showcase for these methods which are also viable even in damper climates – old “cob” houses still survive in the British Isles.

<https://youtu.be/LRpnoyhzHK0>

*With huge thanks to Gwenda Mark for producing the video.*

**Early February 2019 some more pictures of life on site with visits from very interested parties**

Thanks to our driver Rachid and chief guide Said for sending the photos and visiting the building site so often.

*“I’m amazed at your progress with new site. Your enthusiasm is infectious. So honoured to witness your vision. You’ve put your heart and soul into it for such a long time. Can’t wait !” Quote from a guest mid-January 2019*



Footings for the reception, office and library, with Mohamed the head builder on the right. He’s a delight to work with – very wise, very practical, very experienced and happy to listen to our unusual requests. He runs the best organised site that our building services engineer Brian Mark has ever seen after many years in the trade.



Discussions over planting the Olive Grove in an east facing large triangular niche in the earth walls in the garden; an ideal place for morning yoga, singing or dancing, with lovely views of the town walls. Taroudant is famous for its olives which have a wonderful flavour due to its climate being warmer than most olive producing areas.



Nordine points “this way to the pool”. On the left you see the rammed earth walls of the first pair of bedrooms.



Feb 8th: the third “banche” brings the wall height of the bedrooms to about 3 metres. The finished height of 3.2 metres will ensure rooms are airy & don't get too hot in summer.



Part of the late 16th Century Aqueduct that brought water to the Sugar Cane Plantations. The same rammed earth method is still being used effectively today. It proves it lasts.



Feb 8th: Sub floor of earth then pebbles, soon to be followed by concrete. The 2-metre-wide styrofoam “Insulation Umbrella” will be around the perimeter of the rooms to isolate the floor slab from the surrounding ground and hence keep it warm in winter and cool in summer



A day later: the subfloor of the reception, office and library in the evening sun

**7/2/19 Electricity & heating** is theme for today & tomorrow. I sent the plan for the electrics for the bedrooms because the electrical conduits will be

buried in the floors. The **electrical wiring will be on a spur system** which not only lends itself to the layout of the buildings but also will especially benefit sensitive individuals for whom the strong magnetic fields generated by ring circuits can be a problem.

By the way we shall be using the **solar energy to create hot water** for the ecolodge, but **not for photovoltaics** (except for solar lights in the gardens, assuming that we can get good ones. One thing that makes us believe we may get decent ones is that Rachid showed me a photo of photovoltaic lights with PRIs being used as road lights). Why no other photovoltaics? Firstly, because our electricity consumption will be low with lots of natural light, no need for reversible air conditioning units because the earth construction, design and materials will keep temperatures comfortable. We use gas for cooking and we now have an **EcoPC using only about 10 watts** in the office. Secondly Morocco is home to **the world's largest solar PV plant** which uses a new highly efficient technologies (both using mirrors: concentrated solar power and parabolic trough), so it's not worth us generating our own inefficiently.

**8/2/19** Today I sent the plan for laying **underfloor heating pipes in the small hammam** we are building to showcase that **solar energy can be used to heat hammams**, thus saving precious wood and gas. We will need to ensure that the pipes are very level to ensure there are **no airlocks** – they will be fixed to the metal reinforcing netting. We talked about which woods to use for the lintels of the doors and windows. I've talked to Brian about **roof design**; we will use Kingspan for roof insulation and **will paint the surface of the roofs white to reflect the sun**; it reminds me of when I lived in Spain and could not use a single storey room built of concrete with a black roof in summer until we built on top of it.



First pair of bedrooms ready for lintels – we are now discussing which

wood to use. We decided to local cypress which is a by-product from the windbreaks from citrus groves. Old-growth Cypress is rated as being durable to very durable to decay resistance and suitable for exterior use. **9/2/19 Flooring** is today's theme: outside we plan to use a **local honey-coloured natural stone paving** which means minimal fossil fuel energy use in its production and transport. In the bedrooms we will use **locally made tiles in darkish colours** to absorb heat in the winter when the sun is low in the sky so will stream into the S facing glazed doors and windows; a darkish grey colour to go with the red/orange textiles bedrooms and deep turquoise for the green/grey textiles. In the kitchen we'll use more expensive glazed non-slip tiles; the staff all like some mid-grey ones that go nicely with a beautiful pinkish-grey granite they have chosen for worktops.

**Now the big question:** what to use for the 8 metre x 8 metre **activity room for yoga, dancing & singing**: below I have set out possibilities which I am consulting leaders about; ideally we will use a sprung floor. I had an excellent suggestion that I could **raise funds to get the best floor (sprung with a marmoleum or bamboo surface)**. Of course some people may want to make a straight donation, but for others it could be a loan which would be applied as a discount against a future holiday or some people may want us to donate the money to a Moroccan charity after we have paid for it. The table on the link summarises some options **floors**

**How to make a donation for the dance floor or the trees:**  
please **Contact Us** with the title "trees" or "dance floor" & we will send details. Thank you!

**10/2/19 Upside Down Roofs** I have drawn out more details of the roof structure; upside down refers to the fact that the waterproof membrane will be placed under the gravel surface; the main benefit is that the gravel layer above protects the membrane from degradation. The roof surface will be pale. In fact, maybe we can use the pale coloured rock slabs that are available in the nearby High Atlas & save using paint. If we do use paint, we will use lime wash on the roofs that are not going to be walked on. **See update on 18th February**

**Window & door shapes** With the walls of the first pair of bedrooms completed a couple of days ago, we have now begun talking about the wood they will use as lintels as well as exact details of the proportions, size and shape of the windows. They will have **wide reveals** inside and outside (the latter to accommodate the shutters outside, the former to allow sunlight to stream into a wider area). Our builder says the lintels of the doors should be about 15 cms above the window lintel. Wise words from friend Kath Wilkinson who taught architectural history at Cardiff University until recently on the facades:

*Get the proportions right. With the entrance way especially, you need a balance between making it look sturdy and 'serious' but also welcoming and not fortress like. The balance between strength and gracefulness is what Islamic architecture is good at so it's a case of working with the shapes you have but trying them out in different proportional relationships to each other.*

Another consideration is the 3D geometry: how do we have **external shutters** as well as the arch in the masonry? By the way for anyone wondering **why we are not building 2 storeys**, the main reason is that it's not allowed because it would obscure the historic town walls, the finest in Morocco, which is very sensible. Also, it will mean that rooms are easily accessed by all. There **will be stairs to the roof terrace** for those who want to keep fit!

**11/2/19 Gardens** We have started to plant **bigger trees** wherever it won't be in the way of the builder. The first area was a small olive grove; the second is some olives behind the kitchen in a triangle where Fatima can't wait to keep some **hens** – like me, she loves both the birds and their fresh eggs. Next we want to acquire some **large date palms** which can be easily transplanted when mature because their roots are concentrated in a small area and regenerate readily, especially if the soil is warm and kept moist for the first 6 months. **The palms will be planted near the pool for shade and because they don't shed leaves into the pool.** We already have some shrubby palms growing on the site; they have lots of basal shoots, so we hope to split them and plant them out. **How to make a donation for the dance floor or the trees:** please **Contact Us** with the title "trees" or "dance floor"

I've completed a general plan of the gardens split into zones linked to watering regimes, soil thickness, position in relation to buildings and more. Most plants will be chosen to feed people or wildlife, for their scent, their drought resistance and many will be endemic, though we will compromise for other qualities such as being quick growing – luckily many plants thrive in Taroudant because it has the warmest winter of any town in Morocco. For example, here are bigger specimens of jacaranda than (according to a specialist) you will see anywhere else in the world. **The warmth radiated by the earth walls at night will not only benefit the plants but also our guests!**

**13/2/19 Ceilings** We have been discussing the merits of different materials to make an attractive (pictured below, in bamboo at Claudio Bravo's palace) for the activity room; either using bamboo (least durable), eucalyptus, split cypress (very durable) or oleander. We decided to use

cypress.



**The “chapeau” of the outside wall of the plot** We have made a decision today to use a simple style to protect the top of the wall from rain, similar to the exterior wall at the Claudio Bravo Palace (below), rather than mimic the castellations of the town walls which we don't want to detract



from.

**14/2/19 Guaranteed strength!** We have employed a laboratory to run tests on the strength of the concrete and metal in foundations and pillars which are required for the rooms wider than 4 metres (the kitchen, dining room and activity room). We would like to avoid using cement altogether due to

its carbon footprint; we are minimising the use of cement by using a lot of pebbles and cobbles within the foundations. Test results were favourable.

**15/2/19 Rain forecast!** Today reports are that there will be patchy rain tomorrow so the tops of the earth walls had to be protected. We'll try to get the protective "chapeau" (hat in English) or roofs on them as soon as we can.

**17/2/19 Flooring quotes for the activity room & opinions** I have received opinions from a number of you – thank you! The most popular surface is either bamboo or marmoleum. I have tracked down suppliers for both. Both are highly sustainable, but when I priced bamboo, I learned it was going to be incredibly expensive because Morocco applies:

1. 25% duty on imports from China whereas trade with Europe (where marmoleum is produced) is welcomed.
2. 12% forest tax on bamboo

**So marmoleum it is**, already my favourite because of its warmth and choice of a range of fabulous marbled colours (several being appropriate Moroccan names like "Golden Saffron", "African Desert" & "Real Sahara"). It is softer than bamboo but still very long lasting. I have it at home & know it can scratch but is easy to sand down and oil to repair. Opinions on colours would be welcomed – I feel sunny colours that go with so many Moroccan carpets would be nice. Here is a link to some **Marmoleum colours** we might use. In addition, the marmoleum supplier understood **sprung floors** and has produced a quote from a specialist company. **Conclusion:** we will have a **colourful warm marmoleum surface on top of a sprung floor made from eco-certified materials which are free of toxic glues**. This floor will be ideal for both yoga and dancing.

## ENVIRONMENTAL PRODUCT DECLARATION



FLOORING SYSTEMS

Marmoleum 2.0 and 2.5 mm  
Resilient Linoleum Floor Covering

According to ISO 14025 and EN 15804

### Product Definition

#### *Product Classification and description*

Marmoleum is a resilient floor covering complying with all the requirements of EN-ISO 24011: Specification for plain and decorative linoleum. Marmoleum is made from natural raw materials making it a preferable ecological and durable floor covering with a beautiful and colorful design. The key raw materials include linseed oil, which comes from the flax plant seeds, gum rosin from pine trees, recycled wood waste of wood from controlled forests, limestone and jute from the jute plant which is used for the backing. Because of the use of natural raw materials Marmoleum can be composted in an appropriate composting facility.

Linoleum is produced by Forbo Flooring for more than 150 years and our well-known brand Marmoleum is sold worldwide. This declaration refers to Marmoleum sheet of 2.0 and 2.5 mm nominal thickness covering a broad range of designs and colors :

Real, Vivace, Fresco, Cirrus, Piano, Cacao, Concrete, Slate

Marmoleum is built up in 3 layers as illustrated in the figure 1. These three layers form one homogeneous product by the cross linking bondings formed during the oxidative curing process :

4. **Surface layer:** This layer gives Marmoleum its design and color. After finishing the product at the trimming department a factory finish is applied to protect the surface layer.
5. **Intermediate layer:** This layer is calendared on the jute backing and contains reused Linoleum.
6. **Backing:** The backing is woven jute.



What is marmoleum made from?

**18th February Roof design and Insulation** I had an informative chat with the technical adviser for Kingspan (who have a plant in Spain) and have recently started supplying insulation panels in Morocco due to increased demand; previously cork was used though generally there is minimal insulation used in roofs in Morocco.

The Spanish product Kingspan Poliuretanos PIR AK recommended has a very high insulation value and should be used **beneath a waterproof membrane** so we will install these layers from bottom to top: insulation board, EPDM, a ballast of gravel/pavers, whitewash. We will use **EPDM** which is an extremely durable synthetic rubber roofing membrane which will be held in place by smooth, river-washed stone and, in areas where will need access to solar panels, concrete pavers. These will also protect the membrane from damage from the sun. EPDM is sold in a variety of widths, and in two thicknesses, 45 and 60 mls. We'll use EPDM to line the pool too – it's widely used for irrigation ponds in Morocco too. A new Life-Cycle Assessment of the long-term environmental impact of EPDM shows that it performs significantly better than comparable roof

assemblies. The surface of the roof will be painted white to reflect the sun's rays and this help to keep the roof cool.

**21st February** We now fully understand why some of the local government officials apologised about the rubbish on the site. At some point in the past a pit was dug (probably to obtain building material and this has subsequently been filled with waste). A JCB worked all day to remove and separate this from clean soil and the rubbish has been carted away.



**23rd February** Today the sub-floor of the dining room and activity room have been laid as shown in the photo below, taken in the evening sun and its appearance on the next day!





The metalwork for the reinforced concrete pillars for the big rooms (dining room, activity room & kitchen)



The chapeau to protect the wall from rain

**1st March** A busy week in Morocco and Wales for a variety of reasons including our dance leader breaking her ankle just before she arrived, so no time for reporting until now. Here is a summary of the week's progress: we have had over **20 lorry loads of rubbish removed** from the site at a cost of about £450! We are extracting good quality earth for building from 2

areas which will become gardens in future. We will fill these 2 quarries with soil that isn't good for building. The loosened soil will make it easier for water to pass deeper and encourage deep rooting trees.

**9th March** This week most of the work completed has been a continuation of the methods described above as well as filling the inevitable cracks that develop where the rammed earth sections join; a mix including gravel and lime is used.

Meanwhile a small group of volunteers including myself prepare to travel to Morocco on Tuesday. Our main focus will be the garden design, so we will be starting more cuttings, planting some larger trees, splitting and potting amongst other things.

**Design of the towers and arch at the entrance** When I studied other examples, it was interesting to notice that the relative size and shape of certain elements was unattractive so we have chosen a design along the lines of one our builder suggested as a model – it was one he had constructed in Taroudant.

**10th March** Today I have had a fruitful meeting with Brian Mark to discuss a variety of matters including design of windows, shutters, solar chimneys (which will act as conduits for both light and ventilation in toilets and some of the large rooms, including, of course, the kitchen.



The outer earth wall is completed on the east side.

What a wonderful place these walls will be to grow plants, with heat radiating from the wall at night in the winter.



Floors and reinforced concrete pillars for the kitchen, dining room and activity room



Please **Contact Us** with any ideas or comments which will be very gratefully received. Thank you for your interest. Jane