Ground floor - insulation and underfloor heating

Up until now, we've been walking round on the ground floor concrete slab.

However, on top of this goes 100mm of insulation board, polythene membrane, edge insulation, and underfloor heating pipes; then a flowing screed will be poured to form the final floor level.

Cutting and laying the 100mm Celotex insulation. It cuts easily with a normal handsaw, but the dust gets everywhere and I find it irritates my throat - so I wore a dust mask throughout.

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Where the floor wasn't prefectly level, or the insulation boards had warped and didn't sit flat, I ran a saw through the lines where the boards pivoted, in order to make every bit of board sit flat and elmininate any movement. It's easy to do this while the boards are in situ, no need to lift them.

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Next challenge - how to run gas & electric supplies to the kitchen island. Now is the only chance to do it.
To start with, I set out to create an access void through the screed, and run ducting from the bottom of this void through to a similar void in the utility room. This would allow us to run a gas supply for the hob, and a 10mm supply cable to the oven, at a later date. I made up some formers out of ply offcuts to create the access hole through the screed. You might see that I've stepped the ply outwards near the top - hopefully this will create a recess in the screed into which I can lay a cover if needed.
As I started laying the ducting, I realised that if I continued it in a straight line to the other side of the kitchen, it would provide a very quick and easy method of getting water to the sink and dishwasher - instead of running it up the wall, through the ceiling void, and down the other wall. All I'd need to do is push plastic pipe straight through the ducting. It also means a shorter pipe run for the hot water, which should reduce the time to get hot water to the tap (and therefore waste less water too). So there are 4 ducts in total. 1 for gas, 1 for electric, both in 40mm plastic waste pipe, and 2 smaller insulated ones to run flexible water pipe through. I insulated them so the hot water would stay hot, and the cold water would stay cold ! These 2 ducts are just 21.5mm plastic overflow pipe, pushed through standard 22mm pipe insulation.

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Before laying 60mm insulation over the ducting, I ran beads of expanding foam along the gaps between the ducts (more foam than in this photo), then pressed the insulation in place and piled bricks on top to hold it down until the foam had expanded and set. The idea was to fill all the voids and give the insulation a firm base to sit on without movement, otherwise is might see-saw on the two inner ducts that stood slightly proud of the outer two.

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When using underfloor heating in the screed layer, the edges of the screed have to be insulated to stop heat being lost into the walls. The underfloor heating company provided several rolls of this insulation, and it was pretty straightforward to fit - just run around the perimeter walls and tack it on with gaffer tape. The weight of the liquid screed will push it snugly against the wall, and then excess insulation can be cut off afterwards with a knife.

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Next task is to cover the floor in a plastic membrane. This is because flowing screed will otherwise run through all the gaps everywhere (it's not cheap so you don't want to waste any!), the screed will also attack the foil face of the insulation boards, and if it flowed into gaps between the insulation boards it would act as a thermal bridge to the cold slab below.

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Next major task was to lay the underfloor heating pipes, over 400 metres worth. We got our underfloor heating kit from Contintental Underfloor Heating, and chose their slightly more expensive "AluPEX" pipe, this is a 16mm PEX pipe but with an aluminium layer embedded. This means the pipe holds it's shape when bent which makes laying pipe easier, and less likely to try and escape from its clips when the screed is poured. It's also rated to higher pressures / temps than the standard PEX pipe, for added reassurance.

To start with, I formed the bends around a paint tin while Emma stood on the tin to hold it in place, as my first couple of attempts bending by hand resulted in some minor kinks.
When Emma wasn't able to help for a couple of days due to illness, I perfected the technique of bending by hand without kinking the pipe, and acheieved some quite tight radiused bends with no problem.

There are 7 loops in total.

We've been warned by the screeders that the flowing screed will try and make anything float, including pipes, so we need to go round and put plenty more pipe clips in place otherwise the pipe will lift and pull the clips out with it.

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Here is the UFH manifold, pump/mixer assembly, wiring centre, one of the five programmable room stats, and one of the zone actuators, all laid out on the board I will use for mounting on the wall.

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A few measurements for future reference, as a toilet will be fitted around here - meaning holes will need to be drilled !

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