

## Extension Specifications, 23 Nightingale Avenue

### Contact info

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Floor area (internal): 27.6m<sup>2</sup>

Gross floor area: 31.9m<sup>2</sup>

### Project summary

Replacement of flat roof on garage with pitched roof. Single storey extension between house and garage and to rear of garage. Build to AECB silver standard (i.e. high insulation and airtightness levels).

Clients are capable DIYers and are primarily looking to be handed over a watertight shell. We will undertake interior and finishing tasks, as detailed below.

Airtightness spec: Maximum 1 airchange per hour at 50 pascals

U-values: New Walls: 0.16

Flat roof: 0.11

Pitched roof: 0.12

Garage pitched roof:

New Floor: 0.15

Garage walls: 0.21

### Construction details

#### Walls

##### Construction from inside:

wet plaster (airtightness layer - must cover all surrounding membranes/tapes)

100mm dense concrete block, lime mortar

200mm cavity filled with 200mm dritherm32 batts above ground. low-conductivity wall ties. cavity filled with 200mm XPS below ground.

100mm brick to match house (Dapple lights)

U=0.16

##### Detailing:

- Inner leaf has row of foamglas perinsul blocks to line up with XPS in floor
- XPS top angled to form cavity tray slope. XPS sealed in place/gaps filled with PU foam.
- Seal from floor DPC to bottom of plaster with contega tape or similar
- Install airtightness membrane from behind plaster under joist-ends/top block course/lintel into cavity and wrap around on top of ply roof and tape to roof breather membrane.
- DPC installed 150mm above ground level in external leaf.
- Wall ties spaced 900mm horizontally, 450mm vertically (to BS1243)
- Two 100mm offset layers of Dritherm
- Cut into house cavity wall at junction with house to make continuous cavity. New walls tied-in to existing.
- Cut garage wall at junction with new wall to break thermal bridge. New walls tied-in to existing.

- 11 off 51 degree angled bricks cut/glued below window

Wall ties: 300-350mm, low conductivity: Ancon, or Coughlan Engineering

#### **Timber wall sections**

Above windows and doors on S walls:

outer leaf is clad timber frame 100x50mm, vcl under timber cladding.

Above front door:

Inner and outer leaf 50x75mm timber frame, external vcl under timber cladding

Airtightness membrane under inner ply sheet, taped to door ply surround, wrapped under joists and taped to OSB above joists.

## **Foundations**

Trench foundation(600mm wide), 1m trench depth, 600mm concrete depth C15P. 60kN max load.

Note: trench already dug alongside garden wall (5.5 metres length)

## **Flat Roof**

#### **Construction from inside:**

12.5mm plasterboard

Joists to engineers spec (63\*145 @400mm centres)

140mm thermowool PB20 between joists

18mm ply, taped seams

vcl membrane

60mm PUR

100mm PUR/PIR (e.g. celotex EL3000)

20-80mm tapered PUR/PIR (e.g. celotex EL3000)

Waterproof membrane (sika sarnafil)

U=0.14-0.11

#### **Detailing:**

- Joists hung with joist hangers.
- Breather membrane lapped/taped (tescon) to airtightness membrane via rear of inner leaf on outside walls
- PUR junctions taped
- PUR and EPDM membrane glued to manufacturers spec. (or mechanically fixed with low-thermal bridging fixings)
- Waterproof membrane detailing to manufacturers details: drip edge, kerb edge, upstand to garage wall
- Membrane lapped under pitched roof tiles and valleys to manufacturers spec modified to allow for counterbatten thickness (see drawings)
- Breather membrane airtightness strip taken under pitched roof sarking, and taped to pitched OSB.
- Roof tied down to structure and sideways to walls with galv strapping at <2m spacing.

## **Pitched Roof**

Total (covered)area (in roof plane): ~50m<sup>2</sup>

Section abutting house =13.9m<sup>2</sup>

Garage roof 8.7m\* 3.38m=29.4m<sup>2</sup>(covered area 21.7m<sup>2</sup>)

Connecting section: 6.2m<sup>2</sup>+7.7m<sup>2</sup>=13.9m<sup>2</sup>qcad

#### **Construction from inside:**

Rafters to engineers spec (47x145 @600mm centres) – PAR (exposed)

Plasterboard between joists  
100mm thermowool PB20  
11mm OSB (airtightness), siliconed/taped joints  
150mm PUR foam  
50mm PUR foam  
38mm counterbattens  
50mm battens  
Tile membrane  
Tiles to match existing house (Norfolk Pantile)  
U=0.12

### **Detailing:**

#### **(All roofs)**

- PUR boards glued at butt joints (PU foam) and taped (foil tape) layers offset
- 18mm Ply sarking board under bottom tile for waterproof membrane connection detail
- Counterbattens attached using stainless fixings – e.g. Thor 'super7' helical fixings, 240mm length, at 300mm centres, using alignment/support tool.
- Joists/Rafters dry graded to BS4978, and marked 'Dry' or 'KD'
- Rafters in vaulted ceilings PAR (will be visible)
- Airtightness membrane continuous between various roof segments. Taped joints.

#### **(Abutting house)**

- Counterbattens butt up to sarking board - bottom batten trapping WP membrane on ply 20mm thicker to match counterbatten thickness.
- Breather membrane connected round rafter ends into plaster (contega tape)
- Course of foamglas perinsul let into wall level with roof insulation
- Lead Flashing between wall and tiles
- Airtightness detail on verge inner leaf.

#### **(Garage roof)**

- Ridge tiles mechanically fixed to BS5534 at party wall, using ridge batten+ 100mm nails
- Denti slips fitted under ridge tiles in troughs
- Insulated flashing to Velux windows
- Airtightness membrane wrapped around rafter ends to connect to internal insulation
- False rafter foot detail
- Fireproofing between #21 and #23 garage roof junction

### **Products**

Thor super7 helical fixings: [http://www.thorhelical.com/index.php?option=com\\_content&task=view&id=10&Itemid=10](http://www.thorhelical.com/index.php?option=com_content&task=view&id=10&Itemid=10)

<http://www.thorhelical.com/images/warmroofnail.pdf>

7mm dia, 1100N/mm<sup>2</sup> UTS, 9mm<sup>2</sup> CSA 304 stainless (17w/mK)

[http://www.twistfix.co.uk/products/warm\\_roof\\_fixings/](http://www.twistfix.co.uk/products/warm_roof_fixings/): GBP 17.25 for 50 off 180mm

Need 9.26 fixings/m<sup>2</sup>. So ~463

Norfolk Pantile: <http://www.monier.co.uk/irl/products/product-catalogue/product-range/product/norfolk-pantile.html>

46-50Kg/m<sup>2</sup>, 381x227mm, Gauge 256-306

Ecotherm eco-taper PIR insulation boards 20-80 mm 1:60 taper, paper faced

ecotherm/celotex foil-faced 100mm boards

Pavatex Pavatherm 60mm batts

### **Restraint strapping:**

Use all specified fasteners.

The flat face of the rolled strap must be against the timber.

Horizontal lateral restraint straps should be spaced not more than 2m centres and attached to at least 3 timber members through the use of noggings and packing.

Attach to timber members with four steel screws or four 4mm x 75mm round nails for roofs. The bend length should be

a minimum of 100mm and should be positioned at the centre of an uncut block or brick.  
Vertical restraint strapping should be at least 1m long. Where straps are fixed to masonry, hardened nails 8SWG x 75mm long or wood screws into plugs No 12 x 50mm long should be used. The number of fixings should be in accordance with the design requirements and the lowest fixing should be located within 150mm of the bottom of the vertical strap.

## **Floor**

Hardcore subbase ~150mm  
Sand blinding ~50mm  
Polythene sheet DPM 1200 gauge  
170mm (2x85mm) XPS (Knauf polyfoam Floorboard)  
100mm concrete  
(Polythene to hold screed if using wet screed)  
60mm screed. Contains UFH.  
15mm tile+cement  
U=0.15

### **Detailing:**

- UFH fixing and type TBD
- 85mm XPS upstand against existing (house/garage) walls
- DPM continued into new walls, and over XPS
- DPM connected to plaster with contega tape on existing walls for airtightness
- 68mm service conduit between house and garage (at insulation/concrete interface)

## **Windows and doors**

DG 4-16-4mm units, engineered timber frames. Ug1.1,Uw1.4, low-e, soft-coat, warm-edge  
No trickle vents. (MHRV fitted)  
Furniture and lights TBD  
BS6206 class C glazing in doors and all windows within 800mm of FFL.  
Glazing to BS6262  
Openable area 1.38m<sup>2</sup> (to >30degrees)(5% of floor area)  
Velux or Fakro windows fitted with double joists either side.  
3 off 550x980 centre pivot, double glazed. Insulated flashing

### **Detailing (See drawings):**

- Windows/doors mounted in plywood box extending from inner leaf.
- Positioned behind outer leaf to minimise thermal bridging.
- Tescon tape between frame and box
- Contega tape from box edge to plaster (masonry adjacent)
- Tescon tape from box edge to vcl (timber adjacent)
- Cavity closed with 100mm PUR board+PUR foam, 150mm dpc roll to outer leaf.
- External trim (aluminium/wood) to cover insulation
- Door thresholds flush
- Thresholds base is GRP sheet

## **Drains**

Any drains under building to be protected with 150mm of weak concrete mix  
Lintel and 100mm flexible surround, or flexible pipe section, to be provided where drains pass through external wall footings.

## **Beam/Post**

Beam is Glulam 270x115. Bottom part will be on view.

Beam/post connection to be done as drg. 12mm galv threaded bar epoxied into 14mm hole in post. 12 mm connection piece threaded onto end bar in recess, ~15mm proud of post top. 12 mm galv threaded bar cut to length inserted through 14mm hole through beam, screwed into connector. Washer plus nut on top in rebate to give flush top.

## Tasks

Please quote for items marked 'Quote item A' (B,C,D etc) separately. Everything which is not so labelled goes in base quote.

Task	Details	Comments
<b>Groundwork</b>	Dig up existing external concrete (15m <sup>2</sup> ) and open ground (10m <sup>2</sup> ) down to base depth.	
	Remove doorsteps	
	Lay out foundations/drains	
	Dig foundations (6.5 m to dig, 5.5 metres dug already)	
	Fill foundations	
<b>Drains</b>	Move existing soil pipe to front wall	
	Reconnect bathroom drainage to soil pipe	To be done by householder
	Connect soil pipe to existing foul manhole	
	Find existing rainwater drain route	
	Install soakaway	
	Install rainwater sump by boundary and pipe to soakaway	
	Remove existing garage rainwater pipe	
	Bypass and fill in existing indoor manhole	
	Connect new garage/front drainpipe to existing outdoor manhole	
<b>Floor</b>	Build internal leaf as far as airtight layer	
	Install sub-base	
	Install XPS upstand against existing walls	
	Install 200mm XPS	
	Install vapour barrier (continue into wall)	
	Install 100mm concrete floor, to 70mm below FFL	
<b>Walls</b>	Internal blockwork	
	External bricklaying	
	Cut into house wall and tie in	
	Cut into garage wall and tie in	
	Parge new walls internally at roof junction	
	Install XPS in cavity below ground level	
	Install DPC above XPS (see drg)	
	Install dritherm above ground level	

	Plaster new external walls	To be done by householder
	Build timber framing above windows	
	Fit fascias	
	Fit gutters and downpipes	
<b>Structure</b>	Fit main post	
	Fit main beam, epoxy junction to drawing	
	Bolt timber frame to beam end	
<b>Garage roof</b>	Remove old garage roof	
	Build up garage wall + gables and internal wall to new roof height, with one layer foamglas blocks alongside flat roof	
	Protect neighbouring property (garage roof apex)	
	Remove half-ridge tiles	
	Install joists, taking care of airtightness.	
	Fit Roof windows + flashings	
	Attach PUR with counter-battens. Tape joints.	
	Fit battens and tiles	
	Fit ridge tiles (mechanically fixed to BS 5534)	
	Put firestopping in between garage and store-room	
<b>New Roof (pitched)</b>	Fit rafters/construct roof frame	
	Pitched roof connection to existing house (flashing, foamglas, cavity tray, weep vents)	
	Attach breather membrane and make airtight	
	Install PUR boards – tape joints, counterbatten	
	Fit battens and tiles	
	Construct valleys	
	Install insulation between joists	To be done by householder
	Plasterboard ceiling	To be done by householder
	Construct brick wall between garage and sunroom to fill ceiling vault	
<b>Flat roof</b>	Hang joists	
	Lay ply (or pavatherm) boarding	
	Lay breather membrane	Roofing contractor
	Install insulation over ply and joists - tape joints,	Roofing contractor
	Install tapered insulation	Roofing contractor
	Install waterproof EPDM membrane	Roofing contractor

	Do edge detailing: drip side, kerb side garage upstand connection (flashing),	Roofing contractor
	Install insulation between joists	To be done by householder
	Plasterboard ceiling	To be done by householder
<b>Windows / Doors</b>	Glue ply surround box Foam/tape window into box Tape box into plaster (contega)	Non-roof windows and doors to be supplied by owner.
	Fit door threshold detail (See drawings)	
<b>Ventilation</b>		To be done by householder
<b>Garage Door</b>	Insulated foam-cored section door	To be done by householder
<b>Garage insulation</b>	Fit 100mm PUR and sheathing	To be done by householder
<b>Electrics</b>	Remove existing in outbuildings	To be done by householder
	Fit Sockets and LED lighting in sunroom and workshop	To be done by householder
<b>Underfloor heating (pipe lay only)</b>	Lay pipes, pressure test, lay screed, terminate into kitchen. (note, not full system install)	To be done by householder
<b>Other</b>	Remove and brick-up kitchen door	Done by householder
	Block/brick/insulate doorway	Done by householder
	Remove kitchen door lintel	
<b>Garage floor</b>	Break up and remove garage floor	
	Replace as main room buildup	

## **Materials and suppliers**

Insulations:

Wall insulation: Knauf Dritherm 32 Glass fibre Cavity batts.

Foamglas bricks: Dow Corning

Floor insulation: XPS, ?

Flat Roof insulation: Celotex EL3000

Wall ties.

Ancon teplo2-325. 0.7w/mK, 28.2mm2

or

Coughlan Engineering, Qwik-fix glass-fibre wall-ties, 325mm 0.19W/mK

Epoxy resin for beam connection: Wests System epoxy 105 suitable for timber/threaded bar gluing:  
e.g Six10 thickened epoxy adhesive: <http://westsystem.com/ss/six10-thickened-epoxy-adhesive/>

Beam junction coupler: M12 coupling nut. e.g. [http://rotagriponline.com/index.php?page=shop.product\\_details&product\\_id=61&flypage=shop.flypage&pop=0&option=com\\_virtuemart&Itemid=29](http://rotagriponline.com/index.php?page=shop.product_details&product_id=61&flypage=shop.flypage&pop=0&option=com_virtuemart&Itemid=29)

PU glue.:Dow Corning Insta-stik MP

Fibreglass section: Dura composites.