

# 1:10-SCALE CROSS-SECTION OF PROPOSED NEW REAR EXTENSION, VIEWED FROM WEST SIDE.

## RAMPED ACCESS TO THE BUILDING FROM THE REAR EXTERNAL DOORS.

The ground floor of the building is some 140mm above the adjacent external rear ground level, and the threshold of the rear external double doors that will provide access to the new 1.4m-wide entrance corridor will be 2m from the doorway into the room created by the new extension. It is therefore proposed that the floor of the entrance corridor will be ramped over this 2m distance, and will level out at the point where it reaches the extension opening. The uniform gradient of this section will be no more than some 1:14 (2030/140), better than the maximum gradient of 1:12 allowed for disabled- and wheelchair access in Approved Document M Volume 2 of the Building Regulations (*Access to buildings, and to extensions to buildings, other than dwellings*) and, given its width, the new corridor will therefore meet the requirements for disabled- and wheelchair access not only to the new extension but to the entire building. The new glazed rear external doors (which are to be outward opening), as well as all other double doors, are to be power-operated in their opening and closing, and controlled by a sensor device or a remote switch- and-sensor system easily accessible to disabled users, whether ambulant or wheelchair-dependant.

Softwood closure to the edges of the 165mm Celotex layer and support for the GRP weather-surface over the gutter. Deck soffit faced with uPVC.

Min. 115x75mm rainwater gutter or equivalent, with brackets fixed through a uPVC fascia to the structural fascia board.

Unventilated plywood soffit with a uPVC cover. Tightly fill the inter-joint spaces between the structural fascia at each edge of the overhanging roof and the wall with Dritherm Cavity Slab 32 Ultimate flexible insulating batts, to prevent any thermal bridging via the otherwise exposed overhang of the 25mm-thick roof sub-deck, and to cover any gaps where the joists and the through-wall timbers carrying the fascias pass through the cavity walls.

Use Standard-Duty Catic CG90/100 pressed steel open-back lintels or equivalent, with at least 150mm-long end-bearings, over the openings in the new external cavity walls. Provide each lintel with a suitable polythene or other plastic cavity tray (shown by the heavy broken line) between the "high" inner-leaf mortar course over the lintel and the "low" outer-leaf mortar course seated on the lintel's outer flange, and build plastic weep vents (shown shaded) into the mortar perpend of the masonry immediately above the outer flange to drain any moisture that might penetrate the external wall. These vents also allow the cavity to breathe. Each steel lintel in a cavity wall should have a cavity-tray and weep-vents at 450mm intervals, with at least two weep-vents per lintel.

The double-glazed high-level windows in white uPVC frames are to be 600mm deep overall including their cills, with a U-value of 1.5 W/m<sup>2</sup>K or better. (The fire escape door is to have a minimum U-value of 1.8 W/m<sup>2</sup>K or better.) Note that the window-boards will be some 1925mm above the floor level – a distance not immediately apparent, owing to the necessary vertical "compression" of the drawing. Whilst the approx. 200mm-deep window lintels might be raised slightly above the level shown, which is some 200mm below the roof soffit, this would arguably be counter-productive since it would be likely to bring the windows further into the shadow of the soffit and would thus reduce their light-gathering capacity.

The new external walls are to have an outer 102mm brick leaf to match the existing brickwork, a 100mm-wide cavity effectively filled with 57mm-thick Celotex CF5097 boards (thermal conductivity 0.021 W/mK), and an inner leaf of 100mm Durox Supabloc blocks (compressive strength 3.6 N/mm<sup>2</sup>, thermal conductivity 0.11 W/mK, dry density 460 kg/m<sup>3</sup>) or an equivalent or similar block type such as Celcon Solar or Thermalite Turbo, finished with a 13mm-thick wet-plaster coat. Insulated cavity closers are to be installed around all wall-openings. This configuration will achieve a U-value for the walls of 0.19 W/m<sup>2</sup>K – substantially better than the minimum Building Regulations requirement of 0.28 W/m<sup>2</sup>K for a new external wall.

External damp-proofing course (dpc) at least 150mm over ground level.

## BUILDING REGULATIONS APPLICATION.

Sheet 4 of 4.

### SITE LOCATION:

Hockley Parish Hall (The Old Fire Station),  
58, Southend Road,  
Hockley,  
Essex,  
SS5 4QH.

### PROPOSAL:

Demolish the existing demountable storage building to the rear of the site, and in its place construct a single-storey flat-roofed rear extension.

### CLIENT:

Hockley Parish Council; address as above.

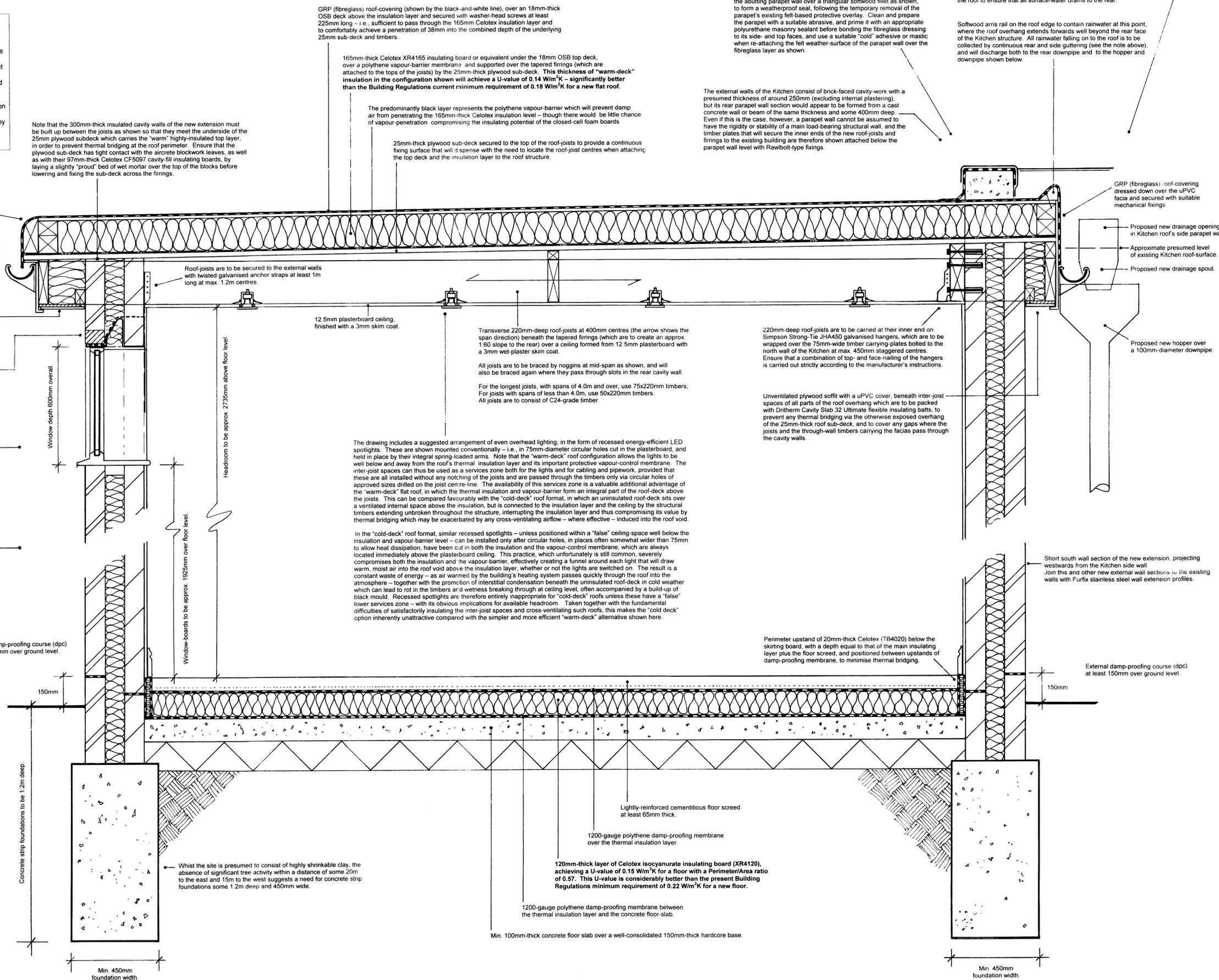
### AGENT:

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**SHEET 4 OF 4: 1:10-SCALE ANNOTATED CROSS-SECTION OF PROPOSED NEW FLAT-ROOFED REAR EXTENSION.**



GRP (fibreglass) roof-covering (shown by the black-and-white line), over an 18mm-thick OSB deck above the insulation layer and secured with washer-head screws at least 225mm long – i.e., sufficient to pass through the 165mm Celotex insulation layer and to comfortably achieve a penetration of 38mm into the combined depth of the underlying 25mm sub-deck and timbers.

165mm-thick Celotex XR4165 insulating board or equivalent under the 18mm OSB top deck, over a polythene vapour-barrier membrane and supported over the tapered firings (which are attached to the tops of the joists) by the 25mm-thick plywood sub-deck. This thickness of "warm-deck" insulation in the configuration shown will achieve a U-value of 0.14 W/m<sup>2</sup>K – significantly better than the Building Regulations current minimum requirement of 0.18 W/m<sup>2</sup>K for a new flat roof.

The predominantly black layer represents the polythene vapour-barrier which will prevent damp air from penetrating the 165mm-thick Celotex insulation level – though there would be little chance of vapour-penetration compromising the insulating potential of the closed-cell foam boards.

25mm-thick plywood sub-deck secured to the top of the roof-joists to provide a continuous fixing surface that will dispense with the need to locate the roof-joist centres when attaching the top deck and the insulation layer to the roof structure.

Roof-joists are to be secured to the external walls with twisted galvanised anchor straps at least 1m long at max. 1.2m centres.

12.5mm plasterboard ceiling, finished with a 3mm skim coat.

Transverse 220mm-deep roof-joists at 400mm centres (the arrow shows the span direction) beneath the tapered firings (which are to create an approx. 1:60 slope to the rear) over a ceiling formed from 12.5mm plasterboard with a 3mm wet-plaster skim coat.

All joists are to be braced by noggins at mid-span as shown, and will also be braced again where they pass through slots in the rear cavity wall.

For the longest joists, with spans of 4.0m and over, use 75x220mm timbers. For joists with spans of less than 4.0m, use 50x220mm timbers. All joists are to consist of C24-grade timber.

The drawing includes a suggested arrangement of even overhead lighting, in the form of recessed energy-efficient LED spotlights. These are shown mounted conventionally – i.e., in 75mm-diameter circular holes cut in the plasterboard, and held in place by their integral spring-loaded arms. Note that the "warm-deck" roof configuration allows the lights to be well below and away from the roof's thermal insulation layer and its important protective vapour-control membrane. The inter-joint spaces can thus be used as a services zone both for the lights and for cabling and pipework, provided that these are all installed without any notching of the joists and are passed through the timbers only via circular holes of approved sizes drilled on the joist centre-line. The availability of this services zone is a valuable additional advantage of the "warm-deck" flat roof, in which the thermal insulation and vapour-barrier form an integral part of the roof-deck above the joists. This can be compared favourably with the "cold-deck" roof format, in which an uninsulated roof-deck sits over a ventilated internal space above the insulation, but is connected to the insulation layer and the ceiling by the structural timbers extending unbroken throughout the structure, interrupting the insulation layer and thus compromising its value by thermal bridging which may be exacerbated by any cross-ventilating airflow – induced into the roof void.

In the "cold-deck" roof format, similar recessed spotlights – unless positioned within a "false" ceiling-space well below the insulation and vapour-barrier level – can be installed only after circular holes, in places often somewhat wider than 75mm to allow heat dissipation, have been cut in both the insulation and the vapour-control membrane, which are always located immediately above the plasterboard ceiling. This practice, which unfortunately is still common, severely compromises both the insulation and the vapour-barrier, effectively creating a funnel around each light that will draw warm, moist air into the roof void above the insulation layer, whether or not the lights are switched on. The result is a constant waste of energy – as air warmed by the building's heating system passes quickly through the roof into the atmosphere – together with the promotion of interstitial condensation beneath the uninsulated roof-deck in cold weather which can lead to rot in the timbers and wetness breaking through at ceiling level, often accompanied by a build-up of black mould. Recessed spotlights are therefore entirely inappropriate for "cold-deck" roofs unless these have a "false" lower services zone – with its obvious implications for available headroom. Taken together with the fundamental difficulties of satisfactorily insulating the inter-joint spaces and cross-ventilating such roofs, this makes the "cold deck" option inherently unattractive compared with the simpler and more efficient "warm-deck" alternative shown here.

The fibreglass weather-deck covering is to be dressed up and over the abutting parapet wall over a triangular softwood fillet as shown, to form a weatherproof seal, following the temporary removal of the parapet's existing felt-based protective overlay. Clean and prepare the parapet with a suitable abrasive, and prime it with an appropriate polyurethane masonry sealant before bonding the fibreglass dressing to its side- and top faces, and use a suitable "cold" adhesive or mastic when re-attaching the felt weather-surface of the parapet wall over the fibreglass layer as shown.

The external walls of the Kitchen consist of brick-faced cavity-work with a presumed thickness of around 250mm (excluding internal plastering), but its rear parapet wall section would appear to be formed from a cast concrete wall or beam of the same thickness and some 400mm deep. Even if this is the case, however, a parapet wall cannot be assumed to have the rigidity or stability of a main load-bearing structural wall, and the timber plates that will secure the inner ends of the new roof-joists and firings to the existing building are therefore shown attached below the parapet wall level with Rawl-bolt-type fixings.

With the closure of the existing rainwater outlet in the rear parapet wall section of the Kitchen structure, a new opening is to be formed in the side parapet wall section as shown, enabling rainwater from the Kitchen roof to discharge to a new hopper, down-pipe and underground surface-water pipe. A short length of gutter is also shown discharging into the hopper here at the south end of a side gutter as part of a continuous gutter system, though this may not be needed if the rear gutter and down-pipe are considered adequate for the new roof. If this is the case, the side and south gutter sections will be unnecessary and an aris rail should be attached to the side of the roof to ensure that all surface-water drains to the rear.

Softwood aris rail on the roof edge to contain rainwater at this point, where the roof overhang extends forwards well beyond the rear face of the Kitchen structure. All rainwater falling on to the roof is to be collected by continuous rear and side guttering (see the note above), and will discharge both to the rear down-pipe and to the hopper and down-pipe shown below.

GRP (fibreglass) roof-covering dressed down over the uPVC fascia and secured with suitable mechanical fixings.

Proposed new drainage opening in Kitchen roof's side parapet wall.

Approximate presumed level of existing Kitchen roof-surface.

Proposed new drainage spout.

Proposed new hopper over a 100mm-diameter down-pipe.

220mm-deep roof-joists are to be carried at their inner end on Simpson Strong-Tie JHA450 galvanised hangers, which are to be wrapped over the 75mm-wide timber carrying-plates bolted to the north wall of the Kitchen at max. 450mm staggered centres. Ensure that a combination of top- and face-nailing of the hangers is carried out strictly according to the manufacturer's instructions.

Unventilated plywood soffit with a uPVC cover, beneath inter-joint spaces of all parts of the roof overhang which are to be packed with Dritherm Cavity Slab 32 Ultimate flexible insulating batts, to prevent any thermal bridging via the otherwise exposed overhang of the 25mm-thick roof sub-deck, and to cover any gaps where the joists and the through-wall timbers carrying the fascias pass through the cavity walls.

Short south wall section of the new extension, projecting westwards from the Kitchen side wall. Join this and other new external wall sections to the existing walls with Furfix stainless steel wall extension profiles.

Perimeter upstand of 20mm-thick Celotex (TB4020) below the skirting board, with a depth equal to that of the main insulating layer plus the floor screed, and positioned between upstands of damp-proofing membrane, to minimise thermal bridging.

External damp-proofing course (dpc) at least 150mm over ground level.

Lightly-reinforced cementitious floor screed at least 65mm thick.

1200-gauge polythene damp-proofing membrane over the thermal insulation layer.

120mm-thick layer of Celotex isocyanurate insulating board (XR4120), achieving a U-value of 0.15 W/m<sup>2</sup>K for a floor with a Perimeter/Area ratio of 0.57. This U-value is considerably better than the present Building Regulations minimum requirement of 0.22 W/m<sup>2</sup>K for a new floor.

1200-gauge polythene damp-proofing membrane between the thermal insulation layer and the concrete floor-slab.

Min. 100mm-thick concrete floor slab over a well-consolidated 150mm-thick hardcore base.

Whilst the site is presumed to consist of highly shrinkable clay, the absence of significant tree activity within a distance of some 20m to the east and 15m to the west suggests a need for concrete strip foundations some 1.2m deep and 450mm wide.

Concrete strip foundations to be 1.2m deep.

Min. 450mm foundation width.

Min. 450mm foundation width.