## energy analysis retrofit **RETROFIT PROCESSES | STAGES**





Each element was modelled in BuildDesk and a hygrothermal appraisel carried out. Any building made air-tight is at high risk of condensation and mould if moisture cannot be released. In the opposite way of stopping air escaping, moisture from the internal environment must also get to evaporate.

Employing air tight elements (Kingspan TEK panels for the structure) have an internal insulation vapour check plasterboard (KOOLTHERM) The Glaser report sample below refers to highest risk of moisture and oscillating damp in a buildiong - winter months.

EIFS boundary and adjoining properties give badly performing junctions

Plan

Best Months 5. Month of balance: May

Oriented strand board (OSB) KOOLTHERM EPS

Oriented strand board (OSB)

KOOLTHERM EPS JP wallboard plasterboard

Assignment: External wall

Surface temperature to avoid critical surface No danger of mould growth is expected.

30.00 150.00 30.00 150.00 4.00

[m] 0.45 21.30 0.45 13.50 0.06

[m<sup>2</sup>K/W] 0.1154 7.1000 0.1154 4.5000

0.0600

0.00 0.02 0.04 0.08 0.10 0.12 0.14 0.18 0.18 0.20 0.22

[W/(mK)] 0.130 D 0.020 E 0.130 D 0.020 E 0.250 E

[m] 0.0150 0.1420 0.0150 0.0900 0.0150

Worst Months 0.05 0.08 0.10 0.12 0.14 0.16 0.18 0.20 0.22 0.24 0.2

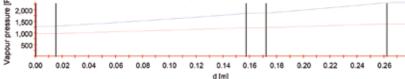


Table of month May: psat[Pa] 1289 1296 1845 1856 2303 2309 Name External / Oriented strand board (OSB) Oriented strand board (OSB) / KOOLTHERM E KOOLTHERM EPS / Oriented strand board (OZ Oriented strand board (OSB) / KOOLTHERM E KOOLTHERM EPS / JP wallboard plasterboard d[m] 0.277 0.262 0.120 0.105 0.015 0.015 0.000 10.7 10.8 16.2 16.3 19.8



II

## Design Strategies:

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Maintain existing floor and insulate by installing Vacuum Insulation Panels on original slab

Additional protection and living space is provided by new extensions to front and rear

The external facade is insulated to U beyond regulation The roof space is insulated to U beyond regulation

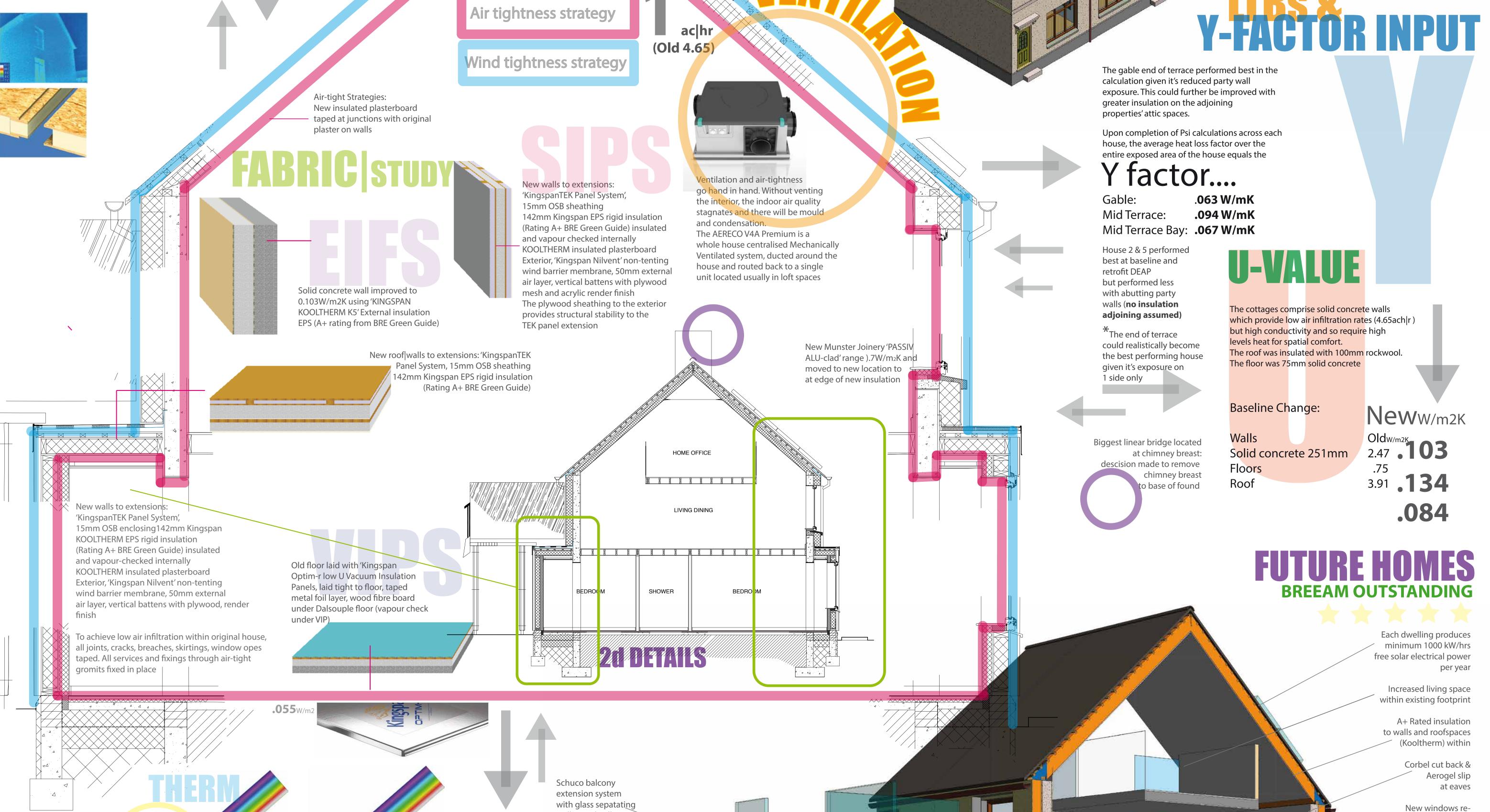
411

Additional living space is provided within the existing building envelope to add to the residents' spatial enjoyment

The existing boiler is not long installed in the house and has a mid range value in the BREEAM assessment. There should be some savings using good services that comply when assessing the amount of work to be carried out on a retrofit

Acres

0.0



The original corbel created a large linear heat loss location so it was cut back to allow the EIFS to continue uninterrupted around to the roof to meet the internal insulation bridged by aerogel at the junction. This avoided the roof being raised



NEW GROUND FLOOR | WALL

Surface temperatures are calculated to assess risk mould and Heat loss junctions along surface condensation internally linear lengths (Linear Thermal For dwellings, the value of fRsi Bridges) take account of should be no less or equal to 0.75, vulnerable areas beyond For three-dimensional corners flanking planar heat of ground floors this value may loss areas be reduced to 0.70, for all They are calculated using points within 10 mm of modelling programmes the point of lowest fRsi. Critical using heat flow resistances areas are where furniture is of different build ups pushed up against the wall and there is little movement of air

If the junctions don't work -back to board



Kingspan have increased their thermal

plasterboard bonded directly onto the

panel. Theis plasterboard has a vapour

performance by internally insulating

their SIPS system using insulated

New extensions by TEK system reduce Psi to negligible levels due to tight connection

**KINGSPAN TEK Panelling** system provides Psi values for all crutical junctions: Ground floor junctions with a U value = 0.15 W/m2K (used in the KINGSPAN calculation) Jamb, head and sill These values were taken and also modelled here by us to confirm All other junctions modelled as per construction ACD sill could be used for the existing first floor sill

check so it will not grow mould from internal moisture. Kingspan allow for services (sockets and cables) to be chased into the SIPS side of the plasterboard to mimimise heat loss. In this situation. given the size of the extension, recommendations would be no services to be fitted on any external wall

NEW GROUND FLOOR | SILL

walls per dwelling The balcony is bolted onto the new extension at roof level avoiding all bridges and adding to external living space

TEK Panel system to extension walls reduce Psi values (heat loss at junctions) to negligible levels with tight connection details at heads and sole plates With each section of panelling, air tightness is achieved. The TEK system wall panel provides 0.19 W/m2K before 90mm 'Kooltherm' insulation was applied internally with 10mm Kooltherm plasterboard

NOT FOR DETAIL: REPRESENTATIONAL ONLY

SUSTAINABILITY DECISIONS CAN BE MADE AT DESIGN STAGE

Party wall (Left) Some Itbs require 3D modelling to examine how the heat travels across

dfferesnt planes

Original concrete floor perimeter reduced to rear door, house 2. LTB heat loss will spike at this point of access

Challenging conventions: Avoiding over design by engineering or building habits calculations for actual size required forraft or strip foundations THERM THRESHOLD SHOWING EXISTING FOUND

**Renewables:** PV panels fitted to the south facing roof bring good A3 BERs across the line to A2 with a future FIT scheme announced, payback on PV is promising In this case, over 1000 17 kWhrs are generated pa, approx-.over 1/3 yearly water heating needs in delivered energy terms (DEAP source)

A VIP is material that is used for heat preservation. It is made of a type of core filling material and vacuum protection surface layer compound. It can effectively avoid air convection caused by heat transfer. Therefore, coefficient §of thermal conductivity can be greatly reduced. Lack of movement is critical and the VIP is glued to the receiving surface. This glue is applied by Roller Coating Method and is coated on the whole surface of VIP.

kw/m₂yr 44

Panels, glued to concrete covered

located to outer skin

back and externally

insulated and resin

**Kingspan TEK panel** 

New insulated floor

insulation greatly reduces

Original floor retained

and insulated with

Kingspan Optim-R

Vacuum Insulation

system to walls

with perimeter

floor junctions

heat escape from

and roofs

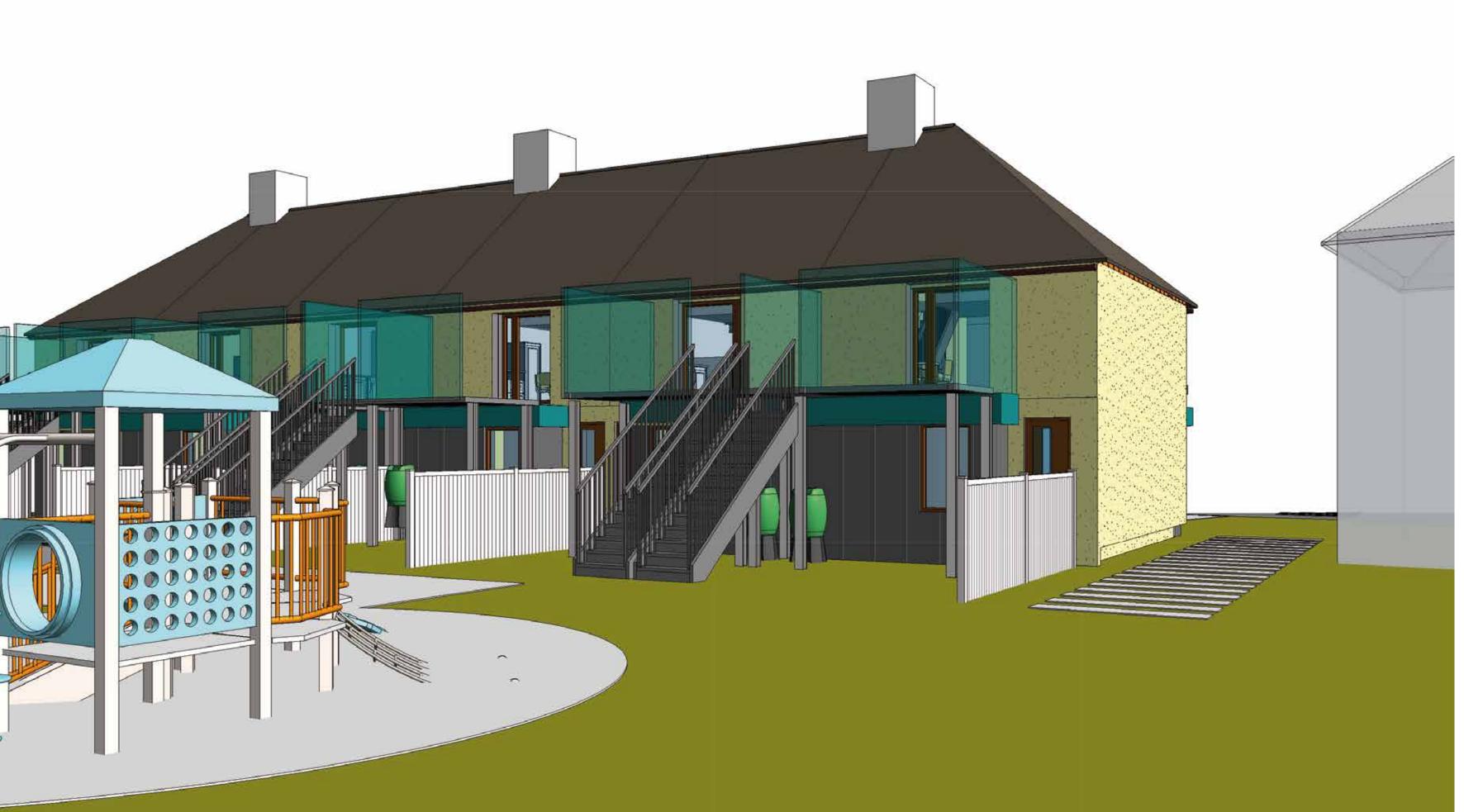
pressed metal sill fitted

Existing sill cut

over







JENNY POWER D14123981 PROJECT 4 SUBMISSION 24 04 15 DT774



Acccessibility is examined in each unit and future living needs are catered for with level access, wider corridors, accessible shower / bathrooms at ground floor

Increased floor area provides for greater spatial allocation mindful of Part M

DEAP AS A DESIGN TOOL

DESISIONS Share

Primary Energy Bills are reduced from 411 kW|hrm<sub>2</sub> to 44 kW|hrm<sub>2</sub> which is a reduction of almost



savings to each home

