



First Wessex 

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SUSTAINABLE HOUSING AWARDS 2014

**First Wessex
Heronwood retrofit project**

Sustainable smaller housing retrofit project of the year

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First Wessex: Heronwood retrofit project

Introduction

The Heronwood project is an energy efficient retrofit and refurbishment of 20 flats in Aldershot, Hampshire.

Pre-retro fit characteristics of the existing flats were:

- Pre fabricated hollow rib external wall panel system (classed as 'hard to treat')
- Single bedroom units arranged in three blocks (8+8+4 units) over 2 storeys
- Communal unheated internal access areas each serving four units
- Occupied mainly by elderly or vulnerable residents on lower than average incomes
- TRADA type timber roof trusses with excessive structural deflection failure
- Outdated kitchens and bathrooms
- Energy Performance Certificate (EPC) rating D60:
 - Gas central heating from back boilers
 - Previously installed loft insulation to current standards
 - PVCu replacement double glazing
- 'Hard to heat' homes with higher than average annual utility costs for size
- Evidence of dampness and mould affecting health of occupants
- Poor quality external areas and landscaping with instances of vandalism.



Heronwood flats post-retrofit project.

Project objectives

The aims of the retrofit project were to:

- Undertake a pilot project to 'hard to treat' pre-fabricated homes in order to gain learning and experience
- Transfer this experience into a 'retrofit blueprint' for project replication to a further 900+ untreated/insulated pre-fabricated First Wessex homes in the Rushmoor Borough Council area in the longer term
- Gain familiarisation of the process of accessing and claiming ECO subsidy and 'Cashback'
- Improve the Energy Performance of the flats to at least an EPC 'B' rating*

- Reduce residents household running costs to contribute to the 'Affordable Warmth' agenda
- Enhance comfort levels and the health and wellbeing of occupants leading to an overall improvement in satisfaction
- Minimise inconvenience to residents remaining in-situ during the retrofit work
- Extend the remaining lifetime of the assets by at least 30 years.

* It is anticipated that all homes in the UK would need to reach an EPC 'B' rating or better in order contribute effectively to meeting the requirements of the Climate Change Act 2008.

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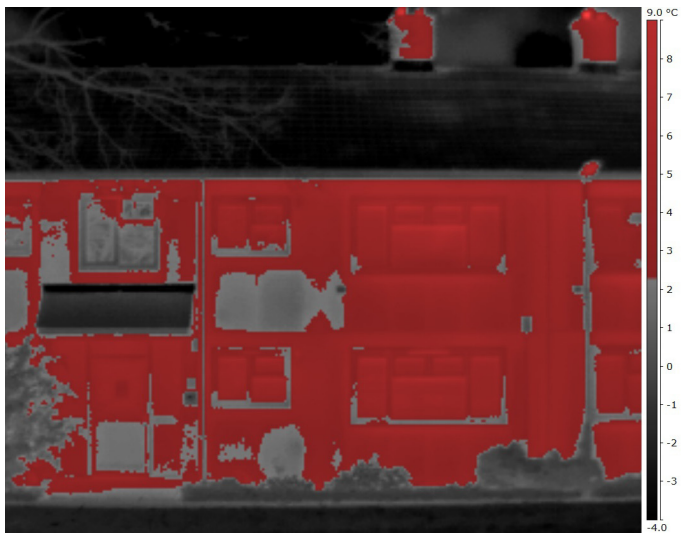
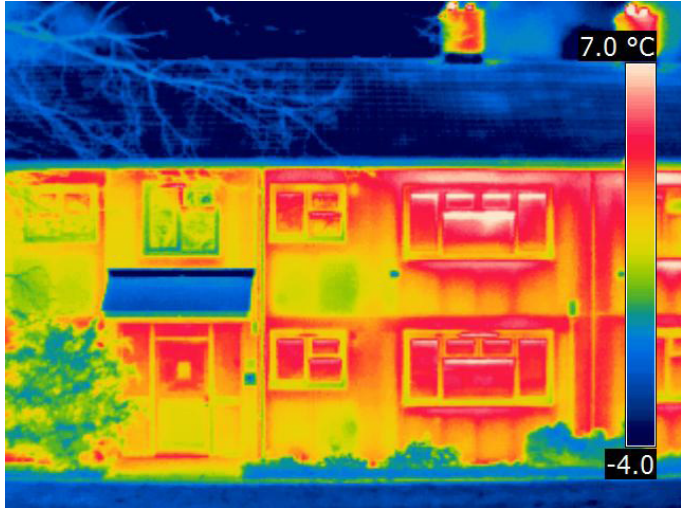
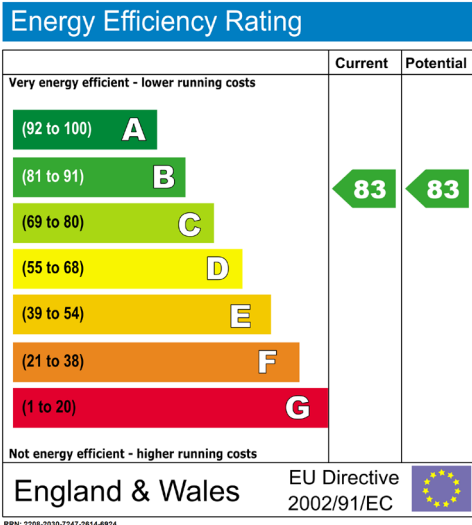
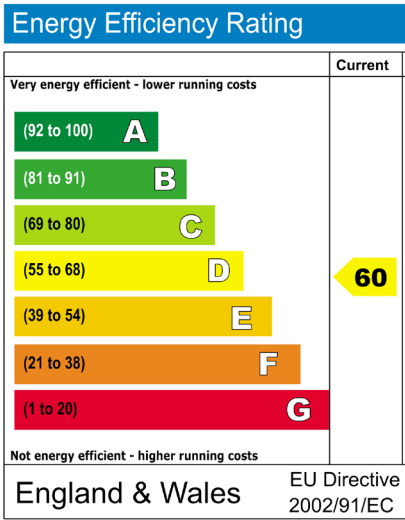
Anticipated savings

Based on SAP energy modelling each retrofitted flat will produce 1.69tCO₂ less per annum. Over a 30 year extended life of the assets the lifetime carbon dioxide emissions savings will be 1.014tCO₂. According to figures produced by the Energy Savings Trust it is estimated that average reductions in household energy running costs will be £350 per annum as a result of the retrofit. Water consumption is projected to reduce by 25% as a result of installing new dual flush toilets and fitting aerated shower heads.

Specialist testing, energy modelling and assessment

The following were carried out pre, during and post retrofit as part of a best practice approach:

- Full SAP energy modelling with options appraisal to reach EPC band 'B' rating
- Lifetime carbon savings calculation for ECO claim purposes
- Infra-Red Thermal (IRT) imaging camera survey
- Air pressure testing using blower door test
- BREEAM domestic retrofit assessment
- Structural Engineer survey and report
- Asbestos, gas and electrical surveys
- Site Waste Management Plan
- Registration of site under Considerate Constructors Scheme initiative.



Infra-red thermal image showing heat loss (and greyscale for comparison purposes) of flats 3-4 Maple Walk pre-retrofit © AAIRS Ltd 2014.

Energy Performance Certificates pre and post retrofit.

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Retrofit energy strategy

The package of measures deployed, as part of the whole home retrofit, and the incremental improvement in energy performance according to SAP modelling is illustrated below:

Measure	SAP rating	Band	CO2 emissions (tonnes / year)	Total % improvement over baseline CO2 emissions
Pre refurbishment	60	D	2.69	-
External Wall insulation (60mm thick EPS insulation and render finish EWI – 0.3W/m ² k)	69	C	1.95	27.51%
100% low energy lighting and mechanical ventilation with heat recovery (individual through wall room system, kitchen & bathroom)	69	C	1.91	29.00%
1.1 kWp PV system (semi integrated, 1.25kWp installed)	76	C	1.51	43.87%
Replacement of back boiler boiler to 'A' rated condensing boiler (combination boiler for space heating and hot water with full set of controls)	81	B	1.08	59.85%
Insulate flat walls to communal areas (60mm thick EPS insulation and rendered plaster finish)	81	B	1.00	62.83%

As illustrated, under initial modelling the household carbon dioxide emissions are reduced by 63% on pre-retrofit levels. The additional amount of PV installed on-site (1.25kWp) is sufficient to reduce regulated emissions to less than one tonne of CO2 per annum and improve the post retrofit SAP to an improved rating of band B (83).

Additional refurbishment works

The flats benefitted from other home improvement works including:

- Replacement kitchens and bathrooms as required
- Decorations to communal areas and stairs
- External works and landscaping to communal gardens including improved drying and bin store areas
- Planting scheme to improve natural habitat

Existing windows would have ideally benefitted from replacement with improved energy efficient double glazing units as demonstrated by the IRT survey, however, as these and the existing GRP canopies over communal entrances were in good order and did not present problems in terms of detailing the new EWI, it was decided that they should remain and not contribute to construction site waste through replacement.



Heronwood flats post-retrofit project.

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Working with residents

Central to the success of the project was the need to reduce disruption to residents as much as possible during the construction phase especially when multiple work/trades would be carried out simultaneously. Steps taken to mitigate this included:

- Initial resident consultation event in nearby community centre
- Pre start homes visits (average three per home)
- Weekly home visits throughout works phase and as requested
- One site drop in available in void flat
- Community retrofit newsletters



“You can definitely tell the difference, it’s much nicer coming home.”
- Heronwood resident

Green Living Advisor service and resident liaison

A member of the First Wessex Green Living Advisor team fulfilled the function of a dedicated resident liaison officer and acted as a single point of contact on all matters for the residents from project concept to completion.



Resident at Heronwood having energy saving devices fitted in her home by a member of the Green Living team.

Every occupant will undergo the Green Living Advisor service which comprises:

- Energy and water efficiency behaviour advice
- Instructions on how to control and obtain optimum benefit from the energy efficiency measures installed as part of the retrofit project.
- Provision and fitting of additional simple cost effective products and devices e.g. power downs, low energy lighting, aerated shower heads.
- Fuel debt advice where relevant.
- Obtaining historic data of utilities consumption and taking meter readings at six monthly intervals post completion for two years for comparison purposes.

Recognising that solar PV is a new type of innovation that residents hadn't previously had experience with, a Wattson current cost meter was provided that takes account of on-site renewable electrical generation and that which is drawn traditionally from the grid. In addition, the PV generation is remotely monitored and 40% of the flats were fitted with meters to enable the amount of export to be recorded so that the benefit of the free electricity used on-site to residents can be calculated.



- Free electricity to use
- Below average usage
- Your average usage
- Above average usage

Personal user Wattson display.

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Programme

Design work started in 2012 and the expected and actual works programme on-site is shown below. See also difficulties encountered.

Programme		
Key stage	Expected	Actual
Start on site	1st Jun 2013	9th Sep 2013
EWI completion	20th Dec 2013	20th Dec 2013
Over roof completion	31st Jan 2014	17th Apr 2014
Project completion	14th Feb 2014	25th Apr 2014

Difficulties encountered

The main frustration of the project team and customers was the length of time the project took to complete.

While various problems were encountered, several of which impacted on the programme, the principal difficulty that led to the delay related to the need to 'over roof' the existing roof structure which had failed through excessive structural deflection. Although this work was known about and included from the outset, it was necessary to provide a significant amount of structural steelwork as part of the design solution. Problems and delays included:

- New over roof – design, planning permission, contractor appointment, demolition of redundant concrete chimneys, sequencing of work, adverse weather and health and safety management.

- High number of contractors on-site simultaneously demanding careful coordination, project management and intensive resident liaison. The Principle Contractor responsibility was changed mid-way through the project.
- The walls between the flats and communal unheated areas were technically external walls requiring an internal wall insulation (IWI) specification and adding significant extra costs.
- Some of the existing and new service penetrations through the EWI were more problematic to deal with and detail than others.
- Concern over resident well being as a result of an extended programme of work and the duration scaffolding remained in place.

Despite the above, residents were extremely patient in the expectation that their homes would be substantially improved for their enjoyment in the longer term.



Construction of new roof structure from front of Tongham Block.

Interactive multimedia energy saving show home and BREEAM

One of the flats become void prior to work commencing and the decision was taken to keep this home empty for possible respite for residents and available for use as a drop in centre during the work. On completion of work this unit was used as a special show home.

The flat was filled with an array of home energy, water and waste saving equipment and demonstration kit making it a fantastic interactive learning tool and visitor experience. The equipment was funded by DECC and is part of the Solent Green Deal initiative to which First Wessex was the sole housing association delivery partner.



Paul Ciniglio, Sustainability and Asset Strategist giving a demonstration of the show home equipment.

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The home was opened up to local residents and the public to visit on five days and was used again for the launch event.

The Heronwood project was assessed under the BREEAM domestic retrofit environmental assessment method. Additional features installed in the show home enabled a 'Very Good' rating to be achieved with all other flats achieving at least a 'Pass' rating helping to demonstrate that the completed retrofit project has reduced the environmental impact of the homes.



Finance

The pre evaluation cost of works per flat are provided below. The total contract value was therefore approx. £724,500. These costs are exclusive of professional fees, VAT and staff on costs.

Budget costs per flat	
Item	Cost £
EWI, communal IWI and associated work	11,725
Semi integrated PV	2,675
Condensing combi boiler	3,275
Through wall MVHR	1,000
Miscellaneous: low 'e' lighting, air tightness etc	250
New over roof	7,300
Landscaping and external works	1,000
Kitchen and bathrooms	8,000
TOTAL	35,225

Financial retrofit incentives

The project benefited from the following:

- ECO at £145/tonne lifetime CO2 savings and Cash back for EWI/IWI at 2013 rates. The ECO intervention was 20% of the total costs of EWI/IWI provision.
- FIT in respect of the solar PV.

Completion event

The end of the construction phase was celebrated as part of an organised eco-tour event on 2nd May.

This was attended by residents, staff, board members, project team members and special guests of First Wessex including National Housing Federation, Inside Housing, Ashden and key note speaker Alison Mathias, Manager Existing Stock, Homes and Communities Agency who said:

“Getting retrofit right is crucially important. Thanks to projects like Heronwood and social housing providers like First Wessex, who have backed retrofit and are prepared to tackle any challenges head on, we are making this a reality.”



Alison Mathias giving a speech at the eco-tour event.

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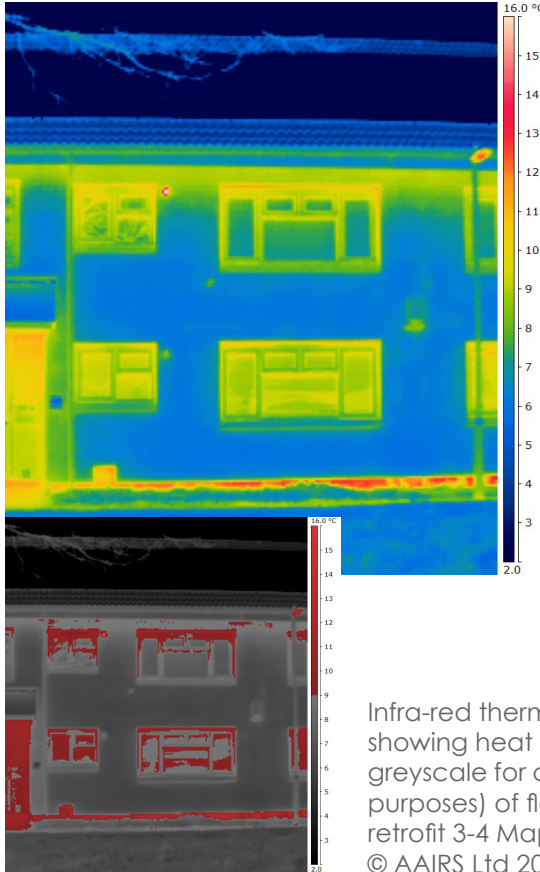
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Monitoring and evaluation

An interim case study has been produced for the purposes of marking the completion of the construction works phase. The monitoring and evaluation stage of the project has commenced and First Wessex recognises that the full success of the project can not be evaluated until at least 12 months has elapsed post completion. Activity during the latest phase will include:

- Detailed review of the retrofit project including both processes and products.
- Performance review of all members of the project team.
- Project cost out turn including retrofit costs, professional fees and staff time.
- Resident satisfaction survey and feedback (as POE study and including social factors such as comfort, ease of use of services).
- Monitoring of gas and electrical consumption and comparison of running costs pre and post retrofit.
- Success with achieving continuity of insulation and air tightness with reference to pre and post IRT surveys and air pressure testing. Average pre retrofit air tightness was 5.93m³/m²/hr@50pascals and it was found that additional sealing up work is required to some flats to ensure each achieves better than 5m³/m²/hr@50pascals post retrofit. An additional test will be carried out following completion of sealing up work. Training for First Wessex operatives in continuity of air tightness is being organised.
- Report and recommendations to First Wessex Executive team after 12 months including:

- Lessons learnt/what would be done differently next time
- Sustainable cost benefit analysis
- A 'retrofit blueprint' template
- Plans for rolling out similar retrofit projects at scale.
- The case study will be updated and disseminated after 12 months.



Infra-red thermal image showing heat loss (and greyscale for comparison purposes) of flats post-retrofit 3-4 Maple Walk © AAIRS Ltd 2014

Project partners

Client	First Wessex
Contractor	Kingfisher Future Homes Ltd
External Wall Insulation	Lawtech Ltd
Kitchens, bathrooms, central heating ventilation and internal works.	First Wessex Property Services
Roofing	Stormforce Roofing Ltd
Solar PV	Dulas Ltd
External works and landscaping	Lotus
Employer's Agent (Contract and project Management, Planning, CDMC, Energy consultant and BREEAM)	Rund Partnership Ltd
Structural Engineer	David Osborne Associates
IRT and air pressure testing	AAIRS Ltd

Further information and contact

For further information about First Wessex and sustainability visit www.firstwessex.org/thechoice where our strategy and action plan can be found, email sustainability@firstwessex.org or call **0800 323 6461**.