**Each Home Counts**

**An Independent Review of Consumer Advice, Protection, Standards and Enforcement for Energy Efficiency and Renewable Energy**

**(“The Bonfield Review report”)**

**Issues paper for the IHBC 30 January 2017**

To be read in relation to<https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/578749/Each_Home_Counts__December_2016_.pdf>

**by John Preston**

**MA(Cantab) DipTP IHBC; Convenor, IHBC Green Panel; Heritage Chair, STBA**

Author, *The Context for Skills Education and Training*

The Journal of Architectural Conservation 10th Anniversary Edition, November 2006 <http://www.ihbc.org.uk/resources/The-Context-For-Skills.pdf>

**with input from members of the IHBC Consultations Panel**

This paper comprises extracts from the Report, plus commentary and references, prepared to inform and support responses to “Each Home Counts” by the IHBC and other interested parties**.**

**It does not represent the views of IHBC or STBA.**

**This paper comprises:**

**Executive Summary of Key Issues**

**A Overview**

**The key omission – solid wall buildings**

**Issues arising, and the BRE Solid Wall Literature Review**

**B Processes and consultation**

**C Detailed comments on “Each Home Counts”**

**Appendix 1 Extracts from the BRE Solid Wall Literature Review**

**Appendix 2 Extracts from Part L of the Building Regulations**

**Appendix 3 Extracts from IHBC response to the CITB ConstructionSkills draft**

**Skills Strategy 2012-17**

**EXECUTIVE SUMMARY OF KEY ISSUES**

**1. ‘Heritage’ and other buildings of solid wall and traditional construction perform very differently to buildings of modern construction in that their fabric is ‘breathable’, absorbing and evaporating water, where modern buildings are ’impermeable’, sealed against water ingress.**

**2. ‘Heritage’ and traditional buildings have been portrayed by some as obstacles or problems for climate change adaptation. In reality, not only are they often amenable to appropriate retrofit, but they also make up a large proportion of the existing housing stock (35% according to the BRE). Successful climate change adaption therefore depends on suitable solutions for this 35%, as well as for the remaining 65%.**

**3. ‘Heritage’ has long, wrongly, been viewed as a niche market (around 6%) by the construction industry, whose training has for the past 50 years been focused on new work, even though up to 50% of construction involves work to existing buildings.**

**4. Government initiatives for retrofit have therefore been superimposed on a longstanding existing deficit in understanding of, and training to work on traditional buildings. Specific problems arising from treating traditional buildings like modern ones are well known, and over a long period, due to the many failed repairs of breathable buildings with cement render which have had to be rectified from the 1970s onwards.**

**5. Traditional buildings, as well as making up 35% of the total stock, have been and continue to be a key target for Government initiatives in relation to both Energy Efficiency and Fuel Poverty, and a particularly proportion of the private rented sector which is the subject of the only Statutory requirements following the 2011 Energy Act.**

**6. Known issues relating to these buildings, and the proven need to take a different approach to them, have been completely overlooked not only in the “Each Home Counts” report, but in the way the Review was carried out.**

**7. Key issues and problems, and the need for a thorough review, were highlighted in a report “Solid Wall Literature Review” by BRE to Government which was published on the DECC website in January 2015. This report was totally, inexplicably, and irresponsibly ignored both by Ministers in their brief to Bonfield when commissioning the Review in July 2015, and by the Review thereafter.**

**8. Evidence relating to failures of inappropriate energy efficiency measures has been suppressed, not publicised; no coherent attempts have either been made, or are envisaged, to learn vital lessons from them.**

**9. A thorough review is needed, as recommended by the BRE report, as a basis for a coherent strategy for meeting climate change targets.**

**10. Instead, Bonfield and the Government are proceeding to unquestioning implementation, guided by the very industry bodies whose ignorance has caused major problems.**

**11. Government is effectively delegating responsibility for energy saving measures to a closed industry group with vested interests in perpetuating the status quo, at a time when radical change is needed to tackle the widespread ignorance of traditional buildings, and the consequent failures and wastage of finance and carbon on inappropriate measures.**

**12. Putting traditional buildings in good repair is a prerequisite of effective energy-saving (as highlighted in British Standard BS 7913:203, ignored by**

**Bonfield). For traditional buildings, what is needed is a combination of appropriate repairs and energy saving measures, where appropriate to the building. “Each Home Counts” does not even mention the need for repairs.**

**13. Even though understanding of traditional building construction is demonstrably essential to the Government’s energy saving aims for 35% of the dwelling stock, the industry continues to ignore traditional buildings. A radical industry-wide re-think is needed, because for the past 50 years the construction industry has trained its employees, at all levels, exclusively in new build. Conservation, repairs and maintenance have long been viewed as a narrow niche and optional market, rather than the mainstream actuality of up to 50% of building projects.**

**14. DECC did at first recognise the need for special consideration of traditional buildings, and convened an Older Properties Working Group. That group has since been disbanded and its members were not invited to participate in the Bonfield Review.**

**15. New National Vocation Standards for Older, Traditional and Vulnerable Buildings were developed under the auspices of DECC’s Older Properties Working Group, approved, and published by AssetSkills. Qualifications based on these standards are in force in Scotland and Wales, and through the CITB in England. “Each Home Counts” does not mention them, and following the demise of AssetSkills the National Occupational Standards are no longer accessible on the web.**

**16. What has also been completely overlooked in the whole process has been the potential for job creation, together with energy saving, which would arise from a new focus on the repair, maintenance and retrofit of traditional buildings.**

**A. OVERVIEW**

**Background**

The Government has a target to “support low-cost measures on energy efficiency, with the goal of insulating a million more homes over the next five years, supporting our commitment to tackle fuel poverty”. Since the start of May 2015 to end July 2016 around 276,000 homes have had at least one insulation measure installed under ECO or the Green Deal.

The Bonfield Review was commissioned by the Government (DECC and DCLG) in July 2015, following the withdrawal of funding from the Green Deal. Meanwhile, ECO continues; nearly 2 million measures had been installed up to the end of September 2016, including around 134,000 solid wall insulations. (from the Government’s Nov 2016 energy efficiency statistics, Each Home Counts ref 10<https://www.gov.uk/government/statistics/household-energy-efficiency-national-statistics-headline-release-november-2016>]

**The key omission – traditional solid wall buildings**

Neither the Ministers’ brief to Bonfield, nor the published “Each Home Counts” report, make any reference to issues relating to solid wall buildings.

“Each Home Counts” fails to note or reference key statistics from the English Housing Survey (“Each Home Counts” ref 3):

* 8.5 MILLION homes (23.5% of the total) have SOLID WALLS.
* 33% of PRIVATE RENTED and 20% of OWNER-OCCUPIED HOMES are PRE-1919 – i.e of traditional solid wall construction

These are key statistics, but not noted anywhere in the report.

How could the Review and its Report have overlooked them?

**Issues arising – the BRE Solid Wall Literature Review**

SERIOUS ISSUES, and “A THOROUGH AND EXTENSIVE REVIEW” NEEDED “BEFORE LARGE SCALE ROLL-OUT” (BRE)

The omissions noted above were, and are, remarkable, given that:

1) Serious issues relating to solid wall and hard-to-heat buildings were notified by BRE to DECC in 2014 in a report published by DECC on 19 January 2015, 6 months before the Bonfield Review was commissioned: *2014 Solid Wall Heat Losses and the Potential for Energy Saving – Literature Review* (see Appendix 1)

<https://www.gov.uk/government/publications/solid-wall-heat-losses-and-the-potential-for-energy-savings-literature-review>

2) The BRE report noted that

* “Insulating the solid wall housing stock is one of the greatest challenges for energy efficiency policy. ……
* Many of the UK’s fuel poor live in these types of properties which are defined in the UK as Hard to Heat Homes (HTH)….
* A thorough and extensive review of buildings that have been insulated with EWI should be undertaken, to endeavour to clearly identify the causes of unintended consequences…
* A comprehensive review could throw important light on the areas of key weakness that are thought to exist in the current external wall insulation marketplace; and that
* From the few detailed in situ studies that exist, there are enough warning signs to suggest that insulating external walls either externally or internally can lead to undesirable consequences when not done with proper consideration of the factors presented here.”

3) The clear message from this BRE Report, the first publication from a major 2-year study commissioned and funded by DECC, was and is that a “THOROUGH AND EXTENSIVE REVIEW ” should be carried out of existing installations, with an assessment of the causes of problems, BEFORE proceeding to any large-scale roll-out of insulation to solid wall buildings.

SERIOUS ISSUES IGNORED

The Review has been led by Peter Bonfield, the Chief Executive of BRE which prepared the report; he was surely in an ideal position to ensure that the serious issues identified by BRE were taken into consideration. This clearly did not happen.

These omissions could at best be described as baffling, but look far more like the suppression of some very inconvenient truths, at a time when the Government is clearly extremely keen to give a green light to the Insulation industry.

INADEQUATE SCOPE

The brief which Ministers gave to the Bonfield Review appears reasonable at first sight, but in fact was totally inadequate because the process has failed to put industry practices under effective external scrutiny.

INADEQUATE CONSULTATION?

This is clear from the basis of the Consultation, which invites interested parties to give “feedback” to an Implementation Process.

WERE MINISTERS AWARE?

It is all too evident that the Ministers who wrote the Foreword had not considered, and may not even have been made aware of, the VERY SERIOUS RISKS, the potential costs and wastage of money and carbon on both inappropriate works and consequential damage to buildings and their subsequent remediation, and the potential liabilities arising from the approach they have endorsed. This is baffling given the issues highlighted in the Solid Wall Literature Review published by DECC in January 2015. Given the contents of that report, had Ministers been made aware of it a decision to proceed with the Review as carried out would have been totally irresponsible.

Were Ministers made aware of the Literature Review and issues raised therein?

What, if any, Risk Assessment was carried out before commissioning the Review?

FAILURES GLOSSED OVER

It is notable that the “Each Home Counts” report conspicuously fails to reference known well-documented failures of solid wall insulation, apart from a brief unspecific reference to remediation in Preston.

EXISTING SAFEGUARDS IGNORED

It is also very worrying that the Report makes no reference to the Special Consideration, in Part L of the Building Regulations, for Traditional and Breathable Buildings.

IHBC was among those who foresaw potential issues 17 years ago, when the then Government first turned its attention to the energy performance of existing buildings, in the draft Part L of the Building Regulations. The original draft Part L noted just one potential problem with older buildings, that there might be an issue with windows.

IHBC, English Heritage, SPAB and others and others then successfully argued the case for special consideration of all older traditional and breathable buildings. Our aim then, and now, was and continues to be to ensure that older buildings are part of the solution to climate change challenges, with their energy performance being improved where feasible without detriment to their character or fabric.

This approach was introduced in 2002, in Parts L1B and L2B of the Building Regulations, in relation to “Historic and Traditional Buildings” as set out in paras 3.8 -3.14 of Part L1B

<https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/540327/BR__PDF__AD_L1B_2013_with_2016_amendments.pdf>, (see Appendix 2)

notably

“3.8.c buildings of traditional construction with permeable fabric that both absorbs and readily allows the evaporation of moisture”

and

“3.9 When undertaking work on or in connection with a building that falls within one  
of the classes listed above, the aim should be to improve energy efficiency as far as is reasonably practicable. The work should not prejudice the character of the host building or increase the risk of long-term deterioration of the building fabric or fittings.”

However DECC and its Ministers (notably the former Energy Minister Greg Barker who was twice pressed in person on this issue) completely overlooked and ignored the Part L1B safeguards in relation to ECO.

A SAFEGUARD FOR GREEN DEAL, BUT NOT FOR ECO

The only such safeguard within Energy Act measures has been that relating to “vulnerable buildings” set out in paragraphs 41-44 of Annex B of the Green Deal Code of Practice <http://gdorb.decc.gov.uk/admin/documents/Green%20Deal%20Code%20of%20Practice%20Version%204.pdf> , in which “vulnerable buildings” are defined as

“(a)  a “historic building” (as defined in Building Regulations Approved Document L1B, 2010), or

(b) a building which is constructed in a way which means that special care is required to ensure that the installation of improvements does not result in damage to or deterioration of the building fabric (this is likely to include most buildings constructed prior to 1914).“

Given the Code of Practice’s clearly stated need for care in relation to “vulnerable buildings”, and the equally clear statement that this applies to most pre-1914 buildings, it may not be surprising that the take-up of Green Deal measures was extremely low (although we have never seen this cited in any report on the failings of the Green Deal).

ECO CONTINUING REGARDLESS – A VERY HIGH RISK APPROACH

What is most concerning, however, is that ECO has continued, without safeguards, and regardless of the issues. What is more, these issues apply to inter-war as well as pre-1914 buildings, as shown by BRE’s own research, as presented by Colin King at Ecobuild 2014

<http://www.slideshare.net/BREGroup/colin-king-ecobuild-6-march-2014>

IHBC has tried repeatedly, but to no effect, to alert those responsible, notably in its responses to the consultations on PAS 2030 and the CITB ConstructionSkills Skills Strategy 2012-17, as well as in direct questions, as mentioned above, to the Minister Greg Barker MP at the All- Party Green Deal Group.

**Conclusions**

I suggest that now is the time to not just respond to Bonfield, but to write to Ministers, to the National Audit Office, and the Chair of the Public Accounts Committee.

The reckless way in which BEIS have proceeded with the Review (and now its ‘feedback’ and implementation processes), ignoring the issues previously raised by BRE and others, should provide a basis for raising the need for scrutiny, including seeking publication of failure rates and remediation costs.

This very strong criticism needs to be combined which is needed has to be very carefully phrased in terms of constructive help in achieving the Government’s aims.

I suggest that the IHBC response should be accompanied by a Press Release, and a campaign, with other interested parties, to raise the issues and get a change in approach.

**John Preston 30 January 2017**

**B. PROCESSES AND CONSULTATION** - INADEQUATE

*Processes for involvement in the Bonfield Review were opaque in the extreme, for those not among existing industry, regulatory, or consumer body players sought out by Bonfield.*

*The report was issued, without publicity, at 4pm on a Friday before Christmas. The 31 January deadline for “Feedback” made no allowance for Christmas and New Year, and is in clear breach of the Govt’s Code of Practice for consultations.*

*However although published by Government Departments, “Each Home Counts” is “an independent report” (sic) and therefore may not be subject to the Government’s Code of Practice.*

*Rather than a formal consultation on what might be done, what appears to be being sought is “feedback” into an implementation process which is already in progress and largely decided, under the auspices of implementation groups whose members are not listed.*

*A request to extend the consultation period, and for details of the membership of the workstream and implementation groups was made to both BEIS and Bonfield Review email contacts, but no reply has been received.*

**C. DETAILED COMMENTS ON “EACH HOME COUNTS”**

**(SECTION BY SECTION, COMMENTARY IN ITALICS)**

**SCOPE**

The published Review covers:

##### Consumer advice and protection

What supports consumers’ decisions ahead of the installation, and what assistance is available when things go wrong?

**Standards framework**

What ensures that the right products are fitted to the right properties in the right way during the installation?

**Monitoring and enforcement**

What ensures that poor quality work is dealt with effectively, and do arrangements for audit, compliance-checking and sanctions provide sufficient assurance of this?”

*All the above, considered at face value, appear reasonable at first sight. However, the Review process has involved existing industry insiders and regulators reviewing processes which are glossed over where they have manifestly failed. The Report does not question existing industry practices, and there is no consideration whatever of traditional buildings and related issues.*

**MINISTERIAL FOREWORD**

**Baroness Neville-Rolfe** (Minister of State at BEIS, now Commercial Secretary to the Treasury) and **Gavin Barwell (**Minister of State for Housing and Planning, DCLG; MP for Croydon Central)

“The Each Home Counts Review has been highly active in consulting a diverse” *“*range of stakeholders, and in driving real change”*.*

“We welcome the Review as offering a clear and tangible way forward, led by industry itself. The Review shows the potential for a new approach that will increase consumer trust and help create the stability and confidence which industry needs to invest in skills and new products over the long-term.”

*Ministers focused on the industry, investment, and consumer confidence. De-regulation agenda continues. No Government concern about failures in existing practices, or regulation. No attempt to change industry bodies or practice. No public interest body oversight.*

“Our focus in Government, when considering possible action related to the recommendations, will be to intervene where it is necessary to create the enabling conditions in which markets can flourish”. *Government seems interested only in facilitating the market, nothing about wastage of money and /or carbon!*

*The Ministers have clearly either not been made aware of, or have chosen to ignore, the findings of, and very serious issues raised by, DECC-funded research and guidance in relation to traditional solid wall buildings:*

**1) STBA’S 2012 “RESPONSIBLE RETROFIT” report** (<http://www.spab.org.uk/downloads/STBA%20RESPONSIBLE-RETROFIT.pdf>

**2) STBA’S RESPONSIBLE RETROFIT KNOWLEDGE CENTRE AND GUIDANCE WHEEL (**<http://responsible-retrofit.org> **)**

**3) the major 2-YEAR SOLID WALL RESEARCH PROJECT BY BRE, commissioned by DECC in response to the issues raised by “Responsible Retrofit”, including the 2 published reports available on the BRE website:**

**a) 2014 SOLID WALL HEAT LOSSES AND THE POTENTIAL FOR ENERGY SAVING – LITERATURE REVIEW (published 19 January 2015 by DECC)**

<https://www.gov.uk/government/publications/solid-wall-heat-losses-and-the-potential-for-energy-savings-literature-review>

(also at <https://www.bre.co.uk/filelibrary/pdf/other_pdfs/Solid-wall-insulation-literature-review.pdf>)

**b) 2016 SOLID WALL HEAT LOSSES AND THE POTENTIAL FOR ENERGY SAVING - CONSEQUENCES FOR CONSIDERATION TO MAXIMISE SWI BENEFITS: A ROUTE-MAP FOR CHANGE lead author C King**

<https://www.bre.co.uk/filelibrary/pdf/projects/swi/UnintendedConsequencesRoutemap_v4.0_160316_final.pdf>)

**THE 2014 LITERATURE REVIEW** – KEY ISSUES HIGHLIGHTED, IGNORED

<https://www.gov.uk/government/publications/solid-wall-heat-losses-and-the-potential-for-energy-savings-literature-review>

*The 2014 Literature Review (extracts in Appendix 1) is the only part of the DECC Solid Wall Study so far published by the Government. It was published by DECC in January 2015, 6 months before the Government commissioned the Bonfield Review. There is nothing in either the Review process or in Each Home Counts to suggest that notice was taken of the key points in this BRE report for DECC and published by DECC.*

*The Literature Review raised, and called for further research on, a series of issues all of which appear to have been ignored by, or glossed over in “Each Home Counts”. The report notes that the number of traditional solid wall buildings may be as high as 35% of homes, and raises a series of issues (extracts below, key points in capitals, details in Appendix 1) requiring investigation and resolution.*

*Given that the report states that: “further studies are needed before a large scale roll-out of wall insulation for heritage buildings can be recommended”, and that these buildings make up 35% of the dwelling stock, to proceed regardless, as happened with the Bonfield Review, was a very high-risk strategy indeed.*

SOLID WALL HOUSING - ONE OF THE GREATEST CHALLENGES….

“Insulating the solid wall housing stock is one of the greatest challenges for energy efficiency policy. It potentially offers significant savings, as there are more than 7 million solid wall dwellings in Great Britain. It is important, therefore, to better understand the properties and performance of solid walls as they stand now and to quantify the impacts of installing solid wall insulation on domestic properties.

LIVED IN BY MANY OF THE FUEL POOR….

Many of the UK’s fuel poor live in these types of properties which are defined in the UK as Hard to Heat Homes (HTH) Measures to improve their performance will be essential to lifting many of these residents out of fuel poverty, and to meet the EU and UK targets for CO reductions.

A SIZEABLE PROPORTION OF THE HOUSING STOCK….

Solid masonry walling makes up a sizeable proportion of the current housing stock, and Wales has the highest proportion of housing stock with solid walls of various constructions, in the region of 34% of its total housing stock is of solid wall type.

LITTLE EVIDENCE THAT CONDITION OF FABRIC IS CONSIDERED….

The issues raised here surrounding the condition of the building fabric prior to insulation is particularly relevant for this project, as there is little evidence that the condition of the existing structure is examined in any great depth when considering external wall insulation.

THE CHALLENGES ALREADY UNDERSTOOD – BUT IGNORED….

Many of the challenges in minimising the risk of causing unintended consequences when installing SWI that we recognise today have been understood for many years….

LACK OF QUALITY CONTROL….

Work undertaken as an early part of this project has highlighted that there is an apparent lack of quality control on site during the installation process. Although standards, such as PAS 2030, requires checks to be made, the knowledge and experience of the person making such checks are not defined, and there is little evidence that the required standard is being achieved in any methodical way.

A THOROUGH AND EXTENSIVE REVIEW OF BUILDINGS THAT HAVE BEEN INSULATED WITH EWI SHOULD BE UNDERTAKEN….to endeavour to clearly identify the causes of unintended consequences;

A COMPREHENSIVE REVIEW COULD THROW IMPORTANT LIGHT ON THE AREAS OF KEY WEAKNESS THAT ARE THOUGHT TO EXIST IN THE CURRENT EXTERNAL WALL INSULATION MARKETPLACE.

APPROXIMATELY 35% OF DWELLINGS…

Buildings of traditional construction are those with permeable fabric that absorbs and enables the evaporation of moisture (English Heritage 2012a and 2012b). In other words, buildings built pre-1919 made of solid walls and with materials that are permeable to moisture are traditionally constructed buildings. Heritage buildings represent approximately 35% of the existing dwellings in the UK as a whole and a large proportion of solid wall buildings.

VERY LITTLE LONG TERM RESEARCH….

there is very little long term research on the behaviour of traditional constructions in practice.

UNKNOWNS AND UNCERTAINTIES….

The literature review reveals many unknowns and uncertainties about the interconnections between these aspects and their individual and combined effect on the performance of the buildings. Some of the knowledge gaps include:

* limited validity of many current standards and models
* uncertain and varying values of thermal conductivity for traditional materials;
* air permeability and ventilation rates in heritage buildings
* uncertainties about the medium and long-term consequences of applying insulation to solid walls made of traditional materials

ESSENTIAL TO UNDERSTAND PRE-EXISTING CONDITIONS AND CHARACTERISTICS….

The guidance and the research presented here highlight the need to understand the pre-existing conditions and characteristics of heritage buildings when proposing energy efficiency retrofits to ensure compatibility between the existing and the new and to prevent damage and deterioration. This is particularly relevant for the implementation of insulation on solid walls due to the complexity of moisture transport within and across the wall build-up, the hygrothermal performance of traditional materials, the breathability of the envelope and the relationship of those aspects to the overall performance and physics of heritage buildings.

URGENT NEED TO INFORM AND IMPROVE STANDARDS AND METHODS…

There is an urgent need to consider how the knowledge gained about the in situ performance and post- retrofit monitoring studies could inform and improve the standards, performance models, methods and guidelines used by the building industry for determining the performance of the building and building elements; and, enhance the data about traditional materials embedded in databases. From the few detailed in situ studies that exist, there are enough warning signs to suggest that insulating external walls either externally or internally can lead to undesirable consequences when not done with proper consideration of the factors presented here. Further studies are needed before a large scale roll-out of wall insulation for heritage buildings can be recommended.

RESEARCH TO BE DISSEMINATED TO INCREASE KNOWLEDGE ABOUT CONSIDERATIONS AND RISKS….

Finally, retrofit work should balance the different aspects concerning heritage buildings: conservation principles, an improvement in energy performance and the indoor environment, the role of occupants in energy consumption reduction and a reduction of existing decay and damage. Therefore, research on the performance of heritage buildings should be disseminated to the building industry, planning and building control authorities to increase their knowledge about the considerations and risks associated with retrofit works.

RISKS OF UNINTENDED CONSEQUENCES FROM MANDATORY STANDARDS….

The current premise of setting minimum acceptable performance levels when retrofitting as part of the Building Regulation requirements may need to be re-assessed, if the likelihood of a mandatory standard results in the creation of unintended consequences, by requiring buildings to improve above their technical capabilities.”

*THE CLEAR MESSAGE FROM THE BRE LITERATURE REVIEW WAS THAT THERE SHOULD BE GREAT CAUTION IN RELATION TO TRADITIONAL SOLID WALL BUILDINGS.*

*THIS MESSAGE HAS BEEN OVERLOOKED OR DISMISSED BY MINISTERS.*

*This lack of consideration is even more concerning given*:

*1) that there is a high proportion of older, solid wall buildings among the Govt’s key targets*

*a) among FUEL POOR households*

*b) within the PRIVATE RENTED SECTOR*

*2) THE RISKS, COSTS, AND POTENTIAL LIABILITIES associated with installations to solid wall buildings under ECO*

*This Ministerial ignorance may not be surprising given that solid wall / traditional building issues have not yet featured in any of the critical reports about the Green Deal etc.*

*The availability of safeguards for traditional breathable buildings under Part L1b of the Building Regulations was raised with the former DECC Minister Greg Barker in person at two meetings of the All-Party Green Deal Group; he stated his ignorance of the Part L provisions, and promised a response from his Department , but nothing was received.*

**CHAIR’S FOREWORD**

“my Review seeks to ensure that, in the future, conventional measures, such as insulation, always deliver the quality levels and outcomes that consumers have every right to expect, underpinned by the protection, service and advice so critical for householders.”

*But the Review and the Report have not even begun to tackle, or even reference, the now well-documented failings arising from inappropriate specification and installation of measures to traditional buildings. Critically, the report fails to even mention that a “one size fits all” approach is not the answer – as clearly stated in BRE’s own published research:*

“An important factor affecting damp specifically in older buildings is the difference in building physics and construction between older and more modern buildings. Unfortunately a one size fits all solution to SWI is therefore not appropriate and can result in underperformance and/or premature failure of the system or building components. Additionally historical buildings may be at greater risk of disrepair which also complicates the installation of SWI. “

(from 2016 Solid wall heat losses and the potential for energy saving - Consequences for consideration to maximise SWI benefits: A route-map for change lead author C King

<https://www.bre.co.uk/filelibrary/pdf/projects/swi/UnintendedConsequencesRoutemap_v4.0_160316_final.pdf>)

*THE CREDIBILITY OF THE WHOLE REPORT, CHAIRED BY THE CEO OF THE BUILDING RESEARCH ESTABLISHMENT, IS SEVERELY UNDERMINED BY ITS FAILURE TO REFERENCE EVEN THE SERIES OF BRE’S OWN REPORTS, INCLUDING THOSE COMMISSIONED BY DECC, HIGHLIGHTING ISSUES RELATING TO TRADITIONAL SOLID WALL BUILDINGS:*

2010 Sustainable refurbishment of non-traditional housing and pre-1920’s solid wall housing C King and C Weeks published by BRE Press

2013 Reducing thermal bridging at junctions when designing and installing solid wall insulation C Weeks, T Ward and C King, BRE Press <https://www.brebookshop.com/samples/327295.pdf>

2014 BRE / DECC In-situ measurements of wall U-values in English Housing

<https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/409428/In-situ_u-values_final_report.pdf>

2015 Report on failure rates and remediation costs for External and Cavity Wall Insulation – BRE Client Report 303-500 prepared for Wales Low and Zero Carbon Hub

<http://www.cavityclaimuk.com/bre-report.pdf>

2016 Designing out unintended consequences when applying solid wall insulation C King and C Weeks <https://www.brebookshop.com/details.jsp?id=327632>

2016 Post Installation Performance of Cavity Wall and External Wall Insulation BRE Wales for Constructing Excellence

<http://www.cewales.org.uk/files/3014/7671/0110/Post_Installation_Performance_of_Cavity_Wall__External_Wall_Insulation.pdf>

2016 Solid wall heat losses and the potential for energy saving - Consequences for consideration to maximise SWI benefits: A route-map for change lead author C King

<https://www.bre.co.uk/filelibrary/pdf/projects/swi/UnintendedConsequencesRoutemap_v4.0_160316_final.pdf>

PLUS reported presentations by Colin King of BRE on Unintended Consequences:

2014 Ecobuild

<http://www.slideshare.net/BREGroup/colin-king-ecobuild-6-march-2014>

*(this presentation on failures in retrofit of inter-war buildings highlighting that the problems extend far beyond the 1919 “cut-off” commonly applied for traditional buildings)*

2015 to CORE, Stafford <http://www.staffordarea.saveyourenergy.org.uk/how/news/archive/Unintended%20consequences>

**“**BRE has documented many examples of homes that have had the wrong material applied badly and with little or no attention to detail. This is storing up trouble for the future as a result of cold bridging, moisture retention, and condensation. This will not only cause deterioration of the building fabric, but also could impact the health of occupants, due to damp and mould inside the house. This evidence forms part of a report to government focusing on these 'unintended consequences' of EWI, which has yet to be published.”

*THIS EVIDENCE HAS STILL NOT BEEN PUBLISHED.*

*Given this extent of BRE’s own research, it is incredible that “Each Home Counts” ignores the issues involved in retrofitting traditional buildings - at least 23% of dwellings overall, and 33% of the private rented sector, according to the English Housing Survey, 35% of all homes according to BRE.*

*WHAT HAS NOTABLY NOT YET BEEN PUBLISHED BY EITHER BRE OR THE GOVERNMENT, IS ANY REPORT DETAILING THE NUMBERS OF PROPERTIES WITH INAPPROPRIATE INSTALLATIONS, AND THE COSTS OF REMEDIATION, IDENTIFIED IN THE BRE STUDY OR OTHERWISE NOTIFIED TO GOVERNMENT.*

**High Level Solution**

*The proposed Quality Mark, and Framework, will be useless in relation to traditional buildings unless specifically amended to ensure that those using the Mark have proven knowledge of traditional construction, that only appropriate measures are specified, and then correctly installed.*

“The Framework will offer the private sector and the Government the route through which to distribute financial incentives, confident of the quality outcome for consumers that will result.”

*There is no basis for such confidence in relation to traditional buildings, given the now well-documented issues and failings – which are conspicuously omitted from the report.*

Advice Provision

*The Information Hub is in theory very welcome, provided that it includes information relating to traditional building construction, and is operated on a public interest basis without affiliations to any industry players, so able to provide genuinely impartial advice.*

**1. VISION**

*Good in theory, but fatally flawed in its failure to consider issues relating to traditional buildings, and the consequent potential for wastage of money and carbon both on inappropriate works, and their subsequent rectification.*

*The Report mentions* *‘access to the latest standards and best practice guidance’. If this is undertaken in a truthful way this must include British StandardB S7913 and whilst it also stresses in 2.3 the opportunities, it doesn’t mention the risks.*

**2. WHY WAS THE REVIEW REQUIRED?**

“In 2014, 11% of English households were classed as being fuel poor,4 with around one in five households finding it difficult to meet their heating and fuel costs5. Living in a cold home can have a series of detrimental effects on physical and mental health, and has been linked with ‘excess winter deaths’6. Focused efforts must be made to ensure these households are engaged in the right way, provided with advice that can be trusted, and that energy efficiency and renewable energy measures are installed that resolve, not exacerbate, the situation.”

*NOTE THE EMPHASIS ON FUEL POOR – MANY OF WHOM WILL BE LIVING IN BUILDINGS OF TRADITIONAL CONSTRUCTION.*

The English Housing Survey (ref 3 – extracts below) *highlights issues relating to the private rented sector*

*NO MENTION OF THE PRIVATE RENTED SECTOR*

*There is no mention of the Private Rented Sector Regulations and their implementation. This is incomprehensible, given that older properties in the Private Rented Sector are key targets for Government initiatives in relation to both Fuel Poverty and Energy Efficiency, and these Regulations place statutory requirements on landlords relating to all new lettings from April 2018.*

“The private rented sector had the largest proportion of homes (33%) built before 1919 compared with both owner occupied (20%) and social sector (7%).

The private rented sector had the highest proportion of non-decent homes (29%) while the social rented sector had the lowest (14%). Among owner occupied homes, 19% failed to meet the Decent Homes standard in 2014.

The most common damp problem was condensation and mould, affecting 598,000 (3%) homes, followed by 422,000 (2%) homes affected by penetrating damp and 311,000 (1%) by rising damp.

Private rented dwellings were more likely to be older and therefore more likely to have defects to the damp proof course, roof covering, gutters or down pipes, which could lead to problems with rising or penetrating damp affecting at least one room in the property.

Taking dwellings with predominantly cavity or solid walls separately, 69% of dwellings with predominantly cavity walls had insulation installed compared with only 9% of dwellings with predominantly solid walls. The social rented sector had a higher proportion of solid walls with insulation (29%) than owner occupied (6%) or private rented sector (6%), “

*Notably, there is no-cross-referencing of the National Trust’s work on upgrading its rented estate, INCLUDING ITS CONCLUSIONS THAT UPGRADING WOULD BE MORE COST-EFFECTIVE WITHOUT USING SOLID WALL INSULATION.*

*INADEQUATE MONITORING*

The English Housing Survey Energy Report 2014 (refs 5 and 9) *considers dampness and condensation without even mentioning issues relating to non-permeable construction and trapped moisture.*

The OFGEM Technical Monitoring report (ref 11) *cites failure rates (and improvements in them) for different measures – but its questions do not even touch on whether the measures were appropriate to the building’s construction.* [*https://www.ofgem.gov.uk/ofgem-publications/59019/eco-tmq.pdf*](https://www.ofgem.gov.uk/ofgem-publications/59019/eco-tmq.pdf)*. No consideration of vapour permeable or not.*

*INADEQUATE PROTECTIONS*

The Westminster Hall debate on Cavity Wall Insulation (ref 12) *is cited, but the then Secretary of State Amber Rudd’s response was “*I will outline the protections in place for customers who receive cavity wall insulation. The installation of all cavity wall insulation must meet the requirements of the Building Regulations 2000, and the materials used to insulate cavity walls are subject to specific standards and must be certified by a technical approval body.”

To ensure the quality of installations under the green deal and ECO, installers must undergo a rigorous authorisation process to become authorised participants. Participants must comply with a publicly available specification setting out requirements for the installation of energy efficiency measures in existing buildings and levels of monitoring of those installations, including for cavity wall insulation. Furthermore, under the previous carbon emissions reduction target and community energy saving programme, and their successor schemes, the green deal and ECO, cavity wall insulation measures must be accompanied by a 25-year guarantee.”

*However the Publicly Available Specification cited by the Secretary of State was PAS 2030, which makes no reference whatever to buildings of traditional construction.*

**3. THE REVIEW’S APPROACH**

**“Widespread evidence gathering and engagement” (sic)**

*There was no public Call for Evidence, nor was there any significant attempt to engage potentially interested parties beyond the Review’s chosen contacts in industry, consumer protection, and government.*

*Notably and highly regrettably, no attempt was made to engage with the members of DECC’s own Older Properties Working Group (now disbanded). There is no indication that the Review was even aware, let alone took account of, the National Occupational Standards for Older, Traditional, and Vulnerable Buildings and related qualifications (including* [*http://www.sqa.org.uk/sqa/68729.html*](http://www.sqa.org.uk/sqa/68729.html) *) which were developed under the auspices of the Group, for DECC, to assist in the appropriate implementation of the Green Deal and ECO measures for buildings of traditional construction.*

*There has been no publication of the members of the Workstream or Implementation groups. The clear conclusion from the Review’s total failure to consider traditional buildings issues is that traditional buildings interests were radically under-represented, if at all, in developing the recommendations.*

*To dismiss issues relating to over a quarter of the target building stock in this way was, and is, a very high-risk strategy.*

*Who was responsible for this decision, and was any risk assessment made?*

**4. and 5. RECOMMENDATIONS**

##### A New Framework

*FOR DWELLINGS OF TRADTIONAL CONSTRUCTION, THE FRAMEWORK RECOMMENDATIONS ARE A RECIPE FOR CONTINUED WASTAGE OF MONEY AND CARBON ON BOTH INAPPROPRIATE WORKS, AND THEIR ENSUING REMEDIATION.*

*As noted previously, the proposed Quality Mark, and Framework, will be useless in relation to traditional buildings unless specifically amended to ensure that those using the Mark have proven knowledge of traditional construction, that only appropriate measures are specified, and then correctly installed.*

*The Code of Conduct, Consumer Charter, and Codes of Practice and Standards need to ensure that building-specific advice, techniques, materials and skills (including bringing the building into proper repair before installing measures) are applied to buildings of traditional construction. Proposed measures and installations should take account of British Standard BS 7913:2013, and the Special Consideration for buildings of traditional and breathable construction set out in Part L1B of the Building Regulations.*

*Neither PAS 2030 nor PAS 2031 (in their original or proposed amended forms) include any reference to traditional buildings and the competences needed for appropriate installations to them. (See IHBC responses to 2011 PAS 2030 consultation:* [*http://ihbc.org.uk/consultations/docs/PDF/PAS2030revised\_response.pdf*](http://ihbc.org.uk/consultations/docs/PDF/PAS2030revised_response.pdf) *and 2016 PAS 2030 consultation:* [*http://ihbc.org.uk/consultations/docs/PDF/PAS2030.pdf*](http://ihbc.org.uk/consultations/docs/PDF/PAS2030.pdf) *). These omissions need urgent rectification, with traditional buildings expertise included in the reviewing groups.*

*THE FRAMEWORK MAKES NO MENTION WHATEVER OF THE NEED FOR TRAINING IN TRADITIONAL BUILDING CONSTRUCTION, BOTH FOR SPECIFYING AND INSTALLING MEASURES, AND FOR NECESSARY REPAIRS TO ENABLE THE MEASURES TO BE EFFECTIVE.*

*IHBC raised these issues, in detail (see below, and Appendix) but to effect, in its 2011 response to CITB ConstructionSkills draft skills strategy 2012-17* [*http://ihbc.org.uk/consultations/docs/PDF/Skills-Strategy-Consultation1-Questions-web%20IHBC%20Final.pdf*](http://ihbc.org.uk/consultations/docs/PDF/Skills-Strategy-Consultation1-Questions-web%20IHBC%20Final.pdf) *(see Appendix 3)*

“34. CITB ConstructionSkills has to recognise that up to 25% of the building stock is made up of historic and traditional buildings, which are inherently sustainable provided that appropriate methods, materials, and skills are used …. CITB ConstructionSkills, needs, urgently, to recognise that historic and traditional buildings require a very different approach, and different skills and understanding, to that being promoted by the draft PAS 2030 to deliver the Green Deal. Urgent and effective intervention is needed.”

*5 YEARS ON, THE PROBLEMS WE PREDICTED IN 2011 ARE ALL TOO EVIDENT, WITH MONEY AND CARBON WASTED ON INAPPROPRIATE INSTALLATIONS.*

*THE FULL EXTENT OF THE PROBLEMS, OF THE REMEDIAL MEASURES REQUIRED, AND OF THEIR COSTS NEEDS URGENT INVESTIGATION.*

***IS THE AVAILABLE EVIDENCE SUFFICIENT TO PROMPT ACTION BY THE NATIONAL AUDIT OFFICE AND / OR THE PUBLIC ACCOUNTS COMMITTEE? IF NOT, WHAT MORE IS NEEDED?***

##### Recommendations 6 and 7. Information Hub

*The Information Hub is in theory very welcome, PROVIDED that it includes information relating to traditional building construction, and is operated on a public interest basis without affiliations to any industry players, so able to provide genuinely impartial advice.*

**Recommendations 8 and 10 Overarching standards framework**

*This needs to recognise the need for appropriate special consideration for traditional buildings, as exemplified by Part L1B of the Building Regulations, and British Standard BS 7913:2013. Guidance on what standards apply, and their potential interactions, for what types of buildings needs to be made freely available.*

**Recommendation 9 Retrofit standards task group**

*This needs to include traditional buildings expertise*

**Recommendation 11 Embed core knowledge**

*Require core knowledge of traditional building construction, with reference to National Occupational Standards and Awards for Older, Traditional and Vulnerable Buildings*

*See* [*http://www.sqa.org.uk/sqa/69483.html*](http://www.sqa.org.uk/sqa/69483.html) *and www.agored.cymru/GetFileQuartz.aspx?fileid=5856751&qualid=127256*

**Recommendation 17 Holistic approach**

*Welcome, but this needs to specifically consider traditional construction*

**Recommendation 19 Best practice and issues to be fully taken into account**

*Agreed, provided that traditional buildings skills and issues are fully included*

**6. IMPLEMENTING THE RECOMMENDATIONS**

*The steps set out in Section 6 assume that the existing industry players can solve the problems. In our view this is a short term, high risk, and potentially very costly approach based on false assumptions.*

*The membership of the Implementation Groups has to be widened to ensure that key issues are properly covered and expensive mistakes are not repeated.*

*The rush to implementation needs to be put on hold, for all solid wall buildings. BEIS and the Bonfield team together need to address the issues raised in BRE’s Solid Wall Research. The new ECO scheme should not be applied to Solid Wall buildings unless and until there has been a thorough review of existing failed schemes.*

*ABOVE ALL, BOTH BEIS AND GOVERNMENT NEED TO*

* *TAKE A LONGER TERM APPROACH*
* *THOROUGHLY REVIEW EXISTING FAILED INSTALLATIONS, SCHEMES AND PRACTICES AS RECOMMENDED BY THE BRE*
* *DEVELOP A COHERENT STRATEGY FOR MEETING STATUTORY CLIMATE CHANGE TARGETS WITH MINIMUM WASTAGE OF FINANCE AND CARBON, AND TO*
* *RECOGNISE THAT SUCH A STRATEGY CAN ONLY BE DELIVERED IF AND WHEN SOLID WALL TRADITIONAL BUILDINGS ARE TREATED DIFFERENTLY TO MORE RECENT BUILDINGS.*

**7. PROGRESS SO FAR**

**Letters of support from industry**

*Not surprising, as the report has been effectively drafted by and for the industry as existing. However there is clear evidence that ‘industry’ doesn’t on the whole understand older buildings and treats them as if they were modern buildings.*

**Revision of PAS 2030 and 2031**

*These do not include traditional solid wall buildings and associated issues. As far as we aware there is no ‘heritage’ or traditional buildings representative on the Retrofit Standards Task Group as convened by BSI. BSI have failed to invite representation from anyone involved in the (highly relevant) British Standard BS 7913:2013.*

**Implementation Board and industry groups**

*Membership not publicised. No sign of any consideration being given to the serious issues raised by the BRE Reports.*

**Creation of a redress fund for Preston**

*This is Bonfield’s one and only, non-specific, mention of the widespread and major issues with existing solid wall insulation schemes. There is no mention of the extent of the problem, of the cost of rectification, or any evaluation of the overall financial and carbon costs arising from inappropriate or wrongly-specified works and their subsequent rectification.*

*There is no reference to, e.g., English Heritage’s detailed examination of 3 large scale schemes in the North of England:*

<https://content.historicengland.org.uk/images-books/publications/external-wall-insulation-traditional-buildings/external-wall-insulation-in-traditional-buildings.pdf/>

*Compare this glossing over of the issues with the recommendations of BRE’s own report on cavity and solid wall insulation in Wales* <http://www.cewales.org.uk/files/3014/7671/0110/Post_Installation_Performance_of_Cavity_Wall__External_Wall_Insulation.pdf>

“Our first recommendation is for a nationally representative survey to identify the scale of unintended consequences after insulation. This research is not able to identify the extent of poor practices, or the development of problems following insulation locally, nationally or regionally. To do this, an entirely different type and structure of survey is required. Such a survey needs to be nationally representative and should therefore, be sampled randomly from the population. Ideally this should include an assessment of a both insulated and uninsulated properties (acting as controls). An existing example of this type, which may prove a model for a future survey in Wales, are the follow-up surveys of wall U-values undertaken in England which follow-up on the nationally representative English Housing Survey. Such a survey could follow-up on any future Welsh House Condition Survey undertaken by the Welsh Government. The last national survey of this type in Wales was the 2008 Living in Wales Survey. An alternative would be to undertake a large national postal survey, to be followed up with site visits. A model for this exists in work undertaken for BRE in the 1990s, which investigated failure rates in dwellings with CWI (described in BRECSU Best Practice Programme GIL 23).

Our second recommendation is for a review of current practices, guidance and methodologies.”

**Solid wall insulationindustry guidance**

*There is no reference to issues with solid wall buildings*

**CIGA and BIBA Scheme**

*The scheme cited has not been published. It should not be cited as an exemplar unless and until it has been published and impartially scrutinized.*

**Moisture risks paper**

*This document prepared by STBA for DECC is vitally important, and publication is urgently awaited!*

**8. CONSUMER PROTECTION**

*No Code of Conduct, however good, will solve problems if it considers only processes, but not the appropriateness of what is being done.*

*This section totally omits any reference to traditional buildings or to the appropriateness of works. Effective consumer protection will not be delivered if it does not provide for 35% of the target buildings.*

*The fact that DECC, existing industry, and consumer protection bodies have all, so far, completely failed to address traditional buildings and their issues leaves NO CONFIDENCE WHATEVER in the ability of existing institutions to provide the protection required in the way which the Report proposes.*

*ANY REGIME WHICH IS INDUSTRY LED, IN THE FORM PROPOSED, WILL PERPETUATE CURRENT PROBLEMS.*

*A RADICAL RE-THINK AND FULLY INDEPENDENT EXPERT OVERSIGHT ARE NEEDED.*

**9. ADVICE AND GUIDANCE**

*The proposals under this heading are commendable in theory, but as with everything else in the report, need amending to ensure that*

1. *that owners are advised to carry out necessary repairs before installing energy efficiency measures*
2. *that a VERY DIFFERENT approach, compliant with British Standard BS793:2013 is applied to buildings of traditional solid wall construction and to other buildings (e.g. cavity wall buildings in high exposure areas) where standard industry practice and “conventional” solutions may be inappropriate.*

*BS 7913:2013 and its principles need to be made available as widely as possible.*

*The STBA’s Guidance Wheel (*[*www.retroft.org/wheel*](http://www.retroft.org/wheel)*) provides a ready-made, DECC-funded tool for identifying issues and options. This should be coupled with a simplified version targeted to building owners.*

*Given how different traditional building construction is from conventional modern construction, consideration should be given to a linked but distinct* ***traditional buildings information hub,*** *either within or linked to the main hub.*

*Most vitally, owners and occupiers of all solid wall traditional buildings from historic to the 1940s need to be given simple, clear advice on the need to distinguish between modern and traditional construction, and how to find appropriate measures for their building type.*

*This will also require radical re-training within the industry, and within most existing advice providers including the Energy Saving Trust.*

Case Study: Bristol City Council

*The Bristol approach and guidance developed by STBA has been exceptional in its funding (including European as well as UK Government sources). This is not replicable within current funding models.*

*IT IS VITAL THAT GOVERNMENT PROVIDES THE RESOURCES AND SUPPORT NEEDED TO ROLL OUT THE WHOLE HOUSE APPROACH ACROSS THE COUNTRY. THIS IS NOT SOMETHING THAT EITHER CAN OR SHOULD BE LEFT TO INDUSTRY.*

*The Bristol guidance and any future developments from it need to be amended to reference BS 7913:2013.*

*The choice of illustration (The Painted House, insulation installed before STBA’s involvement at Bristol) may be unfortunate, given that it is known to have had problems with trapped moisture. A more thorough, questioning approach in the Report would have considered using this illustration as a case study of what insulation was applied, of what remedial measures had to be carried out, and at what cost.*

**10. QUALITY AND STANDARDS**

*This section overlooks the fact that key standards relating to traditional buildings including the Special Consideration under Part L of the Building Regulations, and BS 7913:2013 (and its predecessor BS 7913:1998 previously) have been completely ignored.*

*The only acknowledgement of issues relating to traditional buildings, and even then only implicit, is in references cited in footnotes 26 and 27.*

*Paras 10.1 -10.3 These contain, in footnote 26, the only, and barely glancing, acknowledgement of research into issues relating to traditional buildings. This s inexcusable given that they make up 35% of the existing stock.*

*Para 10.4 The emphasis on whole building approach is vital and welcome, but there is no mention of either Part L or BS 7913, the two sets of requirements which provide specifically for a flexible approach enabling an appropriate solution to be developed for each individual building.*

**Recommendations 8 and 9**

*Welcome in principle, provided that*

* *the Retrofit Standards Task Group includes the necessary expertise to fully assess issues relating to traditional buildings, and*
* *the approach recognises that different standards and approaches will need to be applied to traditional buildings. The starting point should be that PAS 2030 and PAS 2031 in their present form do not cover traditional construction.*

**Recommendation 10**

*Welcome, provided that the scope of the project is framed so as to include traditional construction*

*HOWEVER THE RETROFIT STANDARDS TASK GROUP HAS ALREADY BEEN ESTABLISHED BY BSI, AND THE REVISIONS OF PAS2030 AND PAS2031 ARE CONTINUING, WITH NO INDICATION OF TO WHAT EXTENT TRADITIONAL BUILDINGS ARE BEING CONSIDERED.*

**Case Study - redress**

*This case study appears to commend CIGA’s new and untried complaints procedure.*

*WHAT IT DOES NOT DO, IN ANY WAY, IS DEAL ADEQUATELY WITH REDRESS.*

**APPENDIX 1 Extracts from BRE SOLID WALL LITERATURE REVIEW**

<https://www.gov.uk/government/publications/solid-wall-heat-losses-and-the-potential-for-energy-savings-literature-review>

“Insulating the solid wall housing stock is one of the greatest challenges for energy efficiency policy. It potentially offers significant savings, as there are more than 7 million solid wall dwellings in Great Britain. It is important, therefore, to better understand the properties and performance of solid walls as they stand now and to quantify the impacts of installing solid wall insulation on domestic properties.

Many of the UK’s fuel poor live in these types of properties which are defined in the UK as Hard to Heat Homes (HTH) Measures to improve their performance will be essential to lifting many of these residents out of fuel poverty, and to meet the EU and UK targets for CO reductions.

Solid masonry walling makes up a sizeable proportion of the current housing stock, and Wales has the highest proportion of housing stock with solid walls of various constructions, in the region of 34% of its total housing stock is of solid wall type.

The issues raised here surrounding the condition of the building fabric prior to insulation is particularly relevant for this project, as there is little evidence that the condition of the existing structure is examined in any great depth when considering external wall insulation.

Many of the challenges in minimising the risk of causing unintended consequences when installing SWI that we recognise today have been understood for many years

**4.7 Best practice guidance for installation – avoiding unintended consequences**

Guidance and case studies on SWI are abundant and can be found both in professional and industry publications dating from the 1970’s onwards and in academic sources. An overview of significant sources is presented in this section.

Many of the challenges in minimising the risk of causing unintended consequences when installing SWI that we recognise today have been understood for many years (Building Research Establishment Defects Prevention Unit 1989; Mason 1992; Building Research Establishment 1996; BRECSU 2000a and 2000b). More recently, a wealth of general guidance has been made available by authors on accepted best practices for installation, selection, cost, detailing, and maintenance (Energy Saving Trust 2006a; Straube et al 2012; Honour 2010; King and Weeks 2010; Stirling 2002; Building Research Establishment, 2006a and 2006b). Given the availability of such guidance, there is good reason to believe that with investment in training for installers and designer/specifiers and in quality control and construction management of SWI projects best practices can be achieved. Perhaps more research is required, however, to examine how often best practices are actually followed, the obstacles to achieving these practices, and effects caused by not adhering to them. Changes and updates to many of these guidance documents may be required if there is change to the principles of calculating condensation risk. This project should highlight, in particular, the areas where clearer guidance is required in the context of older breathable buildings and the most appropriate manner in which they should be thermally improved.

There is, at times, conflicting guidance on the most appropriate manner in which to detail for weather tightness and reduced risk of moisture ingress when applying external wall insulation. This project will need to carefully consider the existing guidance and try to outline a clear and consistent process for practitioners and installers alike.

Work undertaken as an early part of this project has highlighted that there is an apparent lack of quality control on site during the installation process. Although standards, such as PAS 2030, requires checks to be made, the knowledge and experience of the person making such checks are not defined, and there is little evidence that the required standard is being achieved in any methodical way.

The condition of the existing wall

The quality of the existing wall must be assessed. An assessment of the current condition of an existing wall will highlight the need for any repairs and suitability for improvement prior to refurbishment.

**4.9 Conclusions and recommendations**

This section has focused on two main unintended consequences of the installation of SWI: the risk of overheating in buildings; and changes to the distribution of moisture in a building and the damage this may cause to the building and its occupants. As in previous sections of the review, there is a call for more research to address gaps in existing knowledge. This call is qualified by a request for greater rigour in the conduct of the research. Many of the existing studies are based on modelling using computer software rather than careful studies of actual buildings in sufficient numbers.

The influence of thermal mass on post-insulated buildings is not well understood and needs to be studied in greater detail. It also needs to be considered alongside orientation and fenestration to assess the risk of overheating. There is conflicting evidence on the role of thermal mass and particularly on the best place to put insulation to avoid overheating, though there is a clear preference for external insulation so that the existing mass of the external walls can remain in play and thereby moderate the excesses of internal temperature swings.

The limitations of the Glaser method in assessing condensation risk have been mentioned previously, as well as those of current hygrothermal simulation tools. There is a lack of field studies on real, occupied buildings that confront the complexity of heat and moisture balances under a range of conditions. The main argument is over the need for ventilation versus breathable constructions, as a means to reduce condensation on surfaces and within constructions. In one sense the debate hinges on a conflict between the traditional and the modern, and is mainly centred on interventions in heritage buildings, though the principles apply to all retrofitted buildings.

A thorough and extensive review of buildings that have been insulated with EWI should be undertaken, to endeavour to clearly identify the causes of unintended consequences; the current arguments are affected by the limitations in different numerical models (Glaser / Wufi). Although Wufi encompasses more parameters (wind-driven rain, water ingress, and local climate data) than Glaser, it is still a numerical model, with serious limitations on the materials and climate data bases within the tool. Much research uses this type of modelling, but it is both costly and impractical for a mass roll-out of supported / funded insulation schemes.

A comprehensive review could throw important light on the areas of key weakness that are thought to exist in the current external wall insulation marketplace. Although at an early stage in this project, there are already indications that the areas of weakness in the EWI process could be categorised into three main causes of unintended consequences: the initial assessment of buildings, systematic problems, and factors relating to occupancy. There is already a growing list of these that need to be considered, and ranking these by risk and effect will help focus the minds of the people involved in making the decision whether to insulate or not.

**5.1 Introduction**

The challenge facing the UK is significant when considering thermal improvements to the existing building stock, especially when endeavouring to preserve the appearance and heritage of buildings. To fully understand this challenge it is necessary to quantify the meaning of heritage. The notion of “heritage buildings” applies to structures of architectural, social or historical significance. In this literature review, heritage buildings are those that have a special architectural feature or character desirable to preserve and likely to be of traditional construction. Buildings of traditional construction are those with permeable fabric that absorbs and enables the evaporation of moisture (English Heritage 2012a and 2012b). In other words, buildings built pre-1919 made of solid walls and with materials that are permeable to moisture are traditionally constructed buildings26. Heritage buildings represent approximately 35% of the existing dwellings in the UK as a whole and a large proportion of solid wall buildings. This section covers the aspects relevant to energy efficiency interventions on listed buildings, buildings in conservation areas and traditionally constructed buildings, with a focus on solid wall insulation. Many of the issues have been introduced earlier but a review focussing on solid wall insulation must give due consideration to this important group, especially when a relatively large amount of research work has been undertaken on properties of this type. The purpose here is to highlight those aspects that are particularly important to heritage buildings and ones that this project will need to consider when making recommendations and issuing any guidance advice.

In the UK, the main institutions charged with the protection of built heritage are English Heritage, Historic Scotland, Cadw (Wales), and the Northern Ireland Environment Agency. In addition, there are organisations that specialise in studies of built heritage, notably SPAB (Society for the Protection of Ancient Buildings) and the recently formed STBA (Sustainable Traditional Buildings Alliance.) In general terms, it is recommended that interventions to improve the energy efficiency of heritage buildings should be based on informed approaches that prevent any risks of “unacceptable damage to the character and appearance.” Energy efficient retrofits of heritage buildings should not cause “any technical conflicts between the existing traditional construction and the energy efficiency measures” (English Heritage 2012a). There are two main aspects to consider for heritage buildings:

* preservation of the original internal and external features due to their historical significance; and,
* the way that heritage buildings are constructed and the way they function.

The way heritage buildings are constructed and operated (envelope properties, floor plan arrangements, ventilation characteristics, heating regime) enables them to cope with the presence of damp differently to modern buildings. (English Heritage 2012a; Roger Curtis, Historic Scotland 2007; Northern Ireland Environmental Agency 2006). However, heritage buildings can suffer from a build-up of damp leading to deterioration, requiring refurbishment works and interventions to address existing damage, to prevent further deterioration and to improve the performance of the wall. They can also be problematic to heat. Thus, any work that produces alterations, extensions (external and internal) or changes in the building’s character and/or behaviour should be based on a full understanding of the existing conditions and the potential consequences to avoid any risk of damage and decay. The following section considers the specific problems posed by the refurbishment of heritage buildings.

**5.2 Thermal behaviour and building physics of heritage buildings**

The thermal behaviour and building physics of buildings have been discussed earlier, but it is worth considering the particular characteristics and problems associated with heritage buildings to understand why they may need special treatment in a programme of solid wall insulation, especially with the need to minimise the risk of unintended consequences. Traditional constructions and materials are often cited as being superior to modern equivalents because they allow buildings to ‘breathe’ and so avoid extreme damp either because of rain penetration or condensation. The use of lime plasters is seen as crucial to this behaviour and their replacement with gypsum plasters is seen as a retrograde step by many traditionalists because they are much more impervious to the moisture movement.

Heritage buildings are complex environmental systems in which the internal environment is created by interactions between the properties of the building envelope and internal features such as chimney stacks, floor plan arrangement (cellular rooms) and draught lobbies (English Heritage 2012a). In heritage buildings, thermal mass, air infiltration rates and properties of the fabric work together to regulate heat loss. Unlike modern buildings, heritage buildings do not have moisture barriers or impermeable membranes to avoid water penetration. Heritage buildings are likely to be made of materials that enable the transport of water through the fabric. In most cases, the small amount of water in the fabric of heritage buildings is not detrimental. However, the ventilation and heating regimes of heritage buildings must contribute to the evaporation of this water. Therefore, the underlying principles that govern the performance and the indoor environment of heritage buildings are likely to differ from those of modern buildings, and this has implications for expectations of thermal comfort. The figure below illustrates some differences between modern and heritage buildings:

One of the key differences between modern and heritage buildings is the properties of the fabric. A heritage building’s fabric tends to be ‘breathable’—it allows moisture within the fabric to evaporate. Breathability refers to “the behaviour of liquid water and water vapour and their effects on the building envelope and its internal environment” (English Heritage 2012). The solid masonry walls of pre-1919 buildings tend to be breathable, consisting of stone or brick with mortar joints, or earth. Solid ground floors, lime-based plasters and renders also have good hygroscopic properties. Breathability refers to the materials’ ability to absorb and release water as vapour following humidity changes (hygroscopicity) and as a liquid through contact (capillarity).

Materials with good hygroscopic capacity stabilise the indoor air humidity, reduce surface condensation and may be able to absorb interstitial moisture without lasting detriment. The ability of walls to absorb moisture depends on the depth of the material exposed to the humidity. This is related to thickness, density, equilibrium of the moisture content and the position of the material in the construction. Vapour permeability is related to the ventilation and air leakage of the building and to the hygroscopic capacity of the fabric. It is measured as the resistance of the material to moisture movement (resistivity). Capillarity defines the absorption and release of water as a liquid.

The main sources of moisture that affect heritage buildings are precipitation, rising damp (heritage buildings do not have damp-proof membranes, though some do have physical damp-proof courses, such as slate), internal moisture vapour (created by occupants and processes) and damaged, leaking services. High moisture levels can lead to the damage of structures, growth of mould and bacteria and a reduced thermal performance of the fabric. Changing the rainwater run-off properties is a good example of a problem created by inadequate consideration of the permeability of the construction. While new buildings tend to have a heavy run-off (impermeable fabric), heritage buildings have a reduced rainwater run-off because they absorb some rainwater into the outer layers of their permeable fabric and release it as water vapour when weather conditions change, sometimes months later. The balance between capillarity water ingress and evaporation is achieved due to the breathability of the fabric and air infiltration in the buildings. In this way, the building is capable of maintaining tolerable levels of moisture within the fabric. If a heritage building is painted on the outside with a closed capillarity material (a non-breathable layer), it creates an impermeable layer, so altering the breathability properties of the fabric and leading to potential decay of the material within the body of the wall. The introduction of an insulated cladding system also has the same effect on the porous nature of the building and needs to be considered carefully when choosing to thermally upgrade or not. The resulting effect of this change will need to be considered during this project.

**5.3 Hygrothermal performance of buildings**

Hygrothermal performance refers to the combined effects of heat and moisture. Hygrothermal behaviour of walls has been discussed previously, but it is worth summarising the main points again. The thermal and hygroscopic behaviour of a building element are interdependent. Increased moisture content increases heat losses, which in turn affect moisture transport. For heritage buildings, where the building materials are likely to have high hygroscopic characteristics, understanding the mechanisms of moisture transport and the hygroscopic behaviour is fundamental to understanding its thermal performance (Changeworks 2008; English Heritage 2012a and 2012b; Browne 2012).

**5.3.1 Calculation of the hygrothermal performance of building elements**

As noted in Section 2, current legislation stipulates the Glaser method for assessing condensation risks in walls. However, this has been shown to be lacking, particularly (but not only) in heritage buildings, with their complex hygrothermal behaviour (Baker 2011; Rye 2010; and Rye and Scott 2012). It is a steady- state method that uses simplified boundary conditions. It is generally applicable for modern building materials, but may not be applicable to the analysis of heritage buildings if the materials have hygroscopic properties that differ from those of modern impermeable construction. Modern buildings use gypsum plasters and plastic membranes to restrict the flow of moisture across layers of a construction. Cavity construction poses fewer problems with interstitial condensation because the inner leaf is at a higher temperature than the outer.

The Glaser method is not capable of representing short term variations, nor the effect of rain and solar radiation. The method does not consider capillary moisture transport nor the absorption capacity of the building element. As a consequence, the method is not able to represent the complex mechanisms of heat and moisture that occur in the building components exposed to variable weather and internal conditions. It is recommended, therefore, that for heritage buildings and for those that have complex hygrothermal behaviour, analysis should be carried out using tools that consider the principles of EN15026 such as the more sophisticated dynamic modelling software WUFITM. This still does not offer a definitive answer or solution but does give a more accurate prediction of moisture build up and transfer. This study also warns that materials whose hygroscopic properties are subject to change over time should be further investigated so as to determine the moisture behaviour accurately and this is a particular area of research that will need to be investigated in more depth should there be a change in standards for calculating condensation and moisture risk as discussed earlier.

Field measurements, when possible and feasible, are even better than relying on models. It is worth noting that although research suggests that calculated and laboratory based results are generally in agreement (Künzel 1998), there is very little long term research on the behaviour of traditional constructions in practice. The SUSREF project, described in chapter 4, is one of the first to carry out this type of study in the field.

**5.3.2 Problems resulting from the hygrothermal behaviour of traditional constructions**

Problems occurring in traditional constructions as a result of solid wall insulation are usually because of changes in the moisture flow and distribution exacerbated by changes in the flow of heat throughout the construction. Künzel & Holm (2009) highlight the practical consequences of this moisture behaviour for porous materials exposed to wind-driven rain; for example, the “material degraded caused by dilatation processes in the micro-structure due to the expansion of freezing water or crystallising salts.” The same paper describes a case study of a half-timbered structure and the consequences of applying a vapour retarder. They find that “the wall’s drying potential to the interior will be severely reduced.” He suggests improvement of the drying potential of the wall towards the interior by using a vapour retarder with variable diffusion resistance or with capillary active insulation materials, for example Calcium Silicate boards. Another study, by Browne (2012), concludes that the use of a vapour control layer on the warm side of the insulation (the normal industry solution) has a negative effect27. According to the WUFITM simulation, it could cause the failure of the insulation. The research suggests that current British standards on condensation risk should be improved. Poor design for moisture control can produce degradation of the building fabric and the deterioration of the indoor environment with health risks to the building occupants.

The study recommends that new in situ measured information should inform the models to increase their accuracy and improve the energy saving designs. It also recommends:

* the incorporation of a database of brick and stone materials in WUFITM that includes the physical characteristics, geological derivation and common regions of usage for the appropriate selection of materials;
* the employment of standardised approaches to simulating traditional buildings;
* the liability of manufacturers with legal obligations if there is a failure after the implementation of
* retrofitting strategies and this failure is attributable to errors in the manufacturer’s calculations; and
* the use of in situ monitoring of relative humidity in the interface between internal insulation and masonry. In the event of disquieting results, further investigations could be developed.

This area of work will need to be researched more significantly as to move to the use of dynamic software without correct material and weather databases could lead to an unjustified feeling of security over any solutions proposed, the software is complex and dependent on the application of accurate boundary conditions and accurate material and weather databases to be at it most reliable.

**5.4 In situ U-value measurements**

In situ studies have identified that the performance of traditional building materials tends to be better than anticipated and that the standard performance of the material might fail to represent the performance measured in situ. Chapter 2 of this review presents the relevant studies in this area. The studies show that U-values can vary significantly from building to building and even within the same building. This area of work is in line with the work undertaken under WP 4 of this project which indicates that the performance of solid walls has been underestimated when using the mathematical calculation method set out in the British Standard.

Contrary to what steady-state calculations suggest, no simple generalisation can be stated about the relationship between U-value and type of material or thickness of elements. The actual construction of the element, defective areas, irregularities, ventilated cavities and the specific characteristics of the local materials could all lead to localised thermal performance variations and discrepancies between calculated and in situ thermal performance (Rye and Scott 2012).

**5.5 Case studies of interventions on heritage buildings**

This section presents a summarised discussion of case studies on the energy efficiency retrofit of heritage buildings. The case studies presented outline the existing condition before the investigation, describe the scope of the retrofit work and present the pre- and post-retrofit performance. Relevant case studies of energy efficiency retrofit in heritage buildings and buildings made of traditional materials have been summarised in Table 11 below. These case studies have been developed by Historic Scotland (cases 1-11), STBA (cases 12-14), SECHURBA Sustainable Energy Communities in Historic Urban Areas, a partnership between Shropshire Council, Marches Energy and Intelligent Energy Europe (cases 15-18), Changeworks (case 19) and the Technology Strategy Board’s Retrofit for the Future programme (case 20).

**5.7 Conclusions and recommendations**

Heritage buildings are complex systems that exhibit a delicate equilibrium between thermal mass, air leakage, building envelope properties and heating regime. The literature review reveals many unknowns and uncertainties about the interconnections between these aspects and their individual and combined effect on the performance of the buildings. Some of the knowledge gaps include:

* limited validity of many current standards and models—specifically, BS 5250, BS EN 13788, and the Glaser method—to assess hygrothermal performance; the need to fully consider changing the standard for assessing condensation risk to EN15026, and the interventions that would need to be set in place for that to happen i.e. UK weather data availability, and accurate material databases on typical UK materials.
* uncertain and varying values of thermal conductivity for traditional materials (the discrepancies between the U-values measured in situ and values embedded in the databases of traditional materials used by models to determine the building performance);
* air permeability and ventilation rates in heritage buildings and how the pre-existing ventilation conditions are related to the specific hygrothermal characteristics of the envelope (U-values, breathability, moisture transport within and throughout wall build-ups);
* uncertainties about the medium and long-term consequences of applying insulation to solid walls made of traditional materials—the change in the performance of the envelope could lead to changes in the whole building performance (balance of moisture, hygrothermal performance), in the indoor environment conditions (mould formation, deterioration of indoor environment quality, overheating risk) and in the overall building condition (decay and damage).

The guidance and the research presented here highlight the need to understand the pre-existing conditions and characteristics of heritage buildings when proposing energy efficiency retrofits to ensure compatibility between the existing and the new and to prevent damage and deterioration. This is particularly relevant for the implementation of insulation on solid walls due to the complexity of moisture transport within and across the wall build-up, the hygrothermal performance of traditional materials, the breathability of the envelope and the relationship of those aspects to the overall performance and physics of heritage buildings.

There is an urgent need to consider how the knowledge gained about the in situ performance and post- retrofit monitoring studies could inform and improve the standards, performance models, methods and guidelines used by the building industry for determining the performance of the building and building elements; and, enhance the data about traditional materials embedded in databases. From the few detailed in situ studies that exist, there are enough warning signs to suggest that insulating external walls either externally or internally can lead to undesirable consequences when not done with proper consideration of the factors presented here. Further studies are needed before a large scale roll-out of wall insulation for heritage buildings can be recommended.

Finally, retrofit work should balance the different aspects concerning heritage buildings: conservation principles, an improvement in energy performance and the indoor environment, the role of occupants in energy consumption reduction and a reduction of existing decay and damage. Therefore, research on the performance of heritage buildings should be disseminated to the building industry, planning and building control authorities to increase their knowledge about the considerations and risks associated with retrofit works. The current premise of setting minimum acceptable performance levels when retrofitting as part of the Building Regulation requirements may need to be re-assessed, if the likelihood of a mandatory standard results in the creation of unintended consequences, by requiring buildings to improve above their technical capabilities.

**APPENDIX 2 Extracts from PART L1B OF THE BUILDING REGULATIONS**

**Historic and traditional buildings where special considerations may apply**

**3.8** There are three further classes of buildings where special considerations in making reasonable provision for the conservation of fuel or power may apply:

1. buildings which are of architectural and historical interest and which are referred to as a material consideration in a local authority’s development plan or local development framework;
2. buildings which are of architectural and historical interest within national parks, areas of outstanding natural beauty, registered historic parks and gardens, registered battlefields, the curtilages of scheduled ancient monuments, and world heritage sites;
3. buildings of traditional construction with permeable fabric that both absorbs and readily allows the evaporation of moisture.

**3.9** When undertaking work on or in connection with a building that falls within one  
of the classes listed above, the aim should be to improve energy efficiency as far as is reasonably practicable. The work should not prejudice the character of the host building or increase the risk of long-term deterioration of the building fabric or fittings.

**3.10** The guidance given by English Heritage3 should be taken into account in determining appropriate energy performance standards for building work in historic buildings.

**3.11** In general, new extensions to historic or traditional ***dwellings*** should comply with the standards of energy efficiency as set out in this Approved Document. The only exception would be where there is a particular need to match the external appearance or character of the extension to that of the host building (see paragraph 4.2).

**3.12** Particular issues relating to work in historic buildings that warrant sympathetic treatment and where advice from others could therefore be beneficial include:

1. making provisions enabling the fabric of historic buildings to ‘breathe’ to control moisture and potential long-term decay problems.

**3.13** In assessing reasonable provision for energy efficiency improvements for historic buildings of the sort described in paragraphs 3.7 and 3.8, it is important that the ***BCB*** takes into account the advice of the local authority’s conservation officer. The views of the conservation officer are particularly important where building work requires planning permission and/or listed building consent.

**3.14** Other classes of buildings to which special considerations apply are usually non-domestic in character, and so are covered in ADL2A and ADL2B.

**APPENDIX 3 Extracts from IHBC RESPONSE TO CITB CONSTRUCTION SKILLS STRATEGY 2012-17**

[*http://ihbc.org.uk/consultations/docs/PDF/Skills-Strategy-Consultation1-Questions-web%20IHBC%20Final.pdf*](http://ihbc.org.uk/consultations/docs/PDF/Skills-Strategy-Consultation1-Questions-web%20IHBC%20Final.pdf)

8. There will be a continuing need for much improved skills in refurbishing and adapting existing buildings in particular for traditional construction, or ‘pre- 1919’ fabric, which demands its own specific skills sets, alongside the introduction of new skills.

A very significant proportion of the work will be to existing buildings. Understanding of what measures are appropriate to such buildings on a whole-life-cycle embodied energy basis, and what may be counterproductive, is absolutely vital.

Training for this work must take into account the very different performance characteristics of pre-1919 and other traditional buildings, as noted above. It should recognise the need for solutions to be developed that suit the physical and performance character of the building(s), with a coordinated approach to the refurbishment of terraces and other groups of buildings of coherent character. Much damage to the character and performance of such buildings (which are inherently sustainable in many ways) has been caused by the inappropriate use of “modern” materials and methods – notably, e.g., the use of cement rather than lime mortars (so trapping moisture and leading to selective degradation of energy-intensive fired or quarried materials), and the use of impermeable renders and coatings over “breathing” walls, with similarly damaging results. Such problems could be vastly magnified by the extensive use of impermeable external insulation.

10. IHBC is very concerned that competent person schemes (e.g. that for insulation) devised for modern buildings will not ensure the right skills for, and could be dangerously damaging to existing buildings. Any such schemes need to specify the type of structure(s) to which the certified skills relate. There have been major problems with Home Energy Assessors trained to deal with modern buildings, who have no understanding of traditional buildings.

Green Deal assessors and surveyors must be fully conversant with the behaviours and performance of traditional buildings; if not, much damage could be done and much money and energy wasted, and in some cases legal responsibilities could be transgressed. PAS2030 in its present form (consultation document to 24th Oct 2011) provides no assurance whatever that such awareness and competence will be provided. Green deal “authorised surveyors” may only have completed an “installer designed training programme” tailored to one product or system; this will not provide overall understanding of how a building performs, or the range of potential options for improving energy efficiency. These problems are highlighted by, e.g., the GQA Level 3 NVQ in Fenestration Surveying, noted as a route to competence in Annex R of the draft PAS 2030, which makes no mention of the Building Regulations special consideration for historic buildings.

IHBC is very concerned indeed that CITB ConstructionSkills has been associated with the development, under the draft PAS 2030, of Green Deal roles and competences which completely overlook the characteristics, performance, and needs of the historic and traditional buildings which form up to 25% of the building stock. This is a situation which has to be remedied.

A helpful starting point would be for PAS2030 to state that works must comply with relevant statutory requirements (including for listed buildings and conservation areas, plus relevant provisions and special consideration under the Building Regulations), and British Standards (including BS7913 *a guide to the principles of the conservation of historic buildings,* and BS 5250 *control of condensation in buildings*). This must be accompanied by mandatory requirements for Green Deal assessors to be fully conversant with these requirements and their implications.

15. There needs to be a renewed and substantial focus on conservation and repairs, as well as on new work, to recognise that new work represents only about 50% of the construction industry.

26. Mainstream architecture courses are almost exclusively focused on new work. It is only at Part 3 Level that architecture students focus more generally on existing buildings. This is the consequence of teachers trained on and focusing on new work, and does not reflect the reality of the professional.

30. In our experience the key training routes for conservation, for example those provided by our recognised CPD providers (web reference), are led by teachers and lecturers that are wholly conversant with the needs of the heritage and traditional-build sectors. However they remain a small, specialist and under-appreciated resource within the industry, and it is essential that the mainstream educators enhance their skills in these key areas. (see comments under 26 above).

34. CITB ConstructionSkills has to recognise that up to 25% of the building stock is made up of historic and traditional buildings, which are inherently sustainable provided that appropriate methods, materials, and skills are used - and which can provide very interesting and satisfying work experiences and career paths.

CITB ConstructionSkills, needs, urgently, to recognise that historic and traditional buildings require a very different approach, and different skills and understanding, to that being promoted by the draft PAS 2030 to deliver the Green Deal. Urgent and effective intervention is needed.

BESA is a welcome initiative in bringing together some of the Sector Skills Councils, but a new initiative is needed to focus on Conservation, Repairs, Maintenance and Climate Change Adaptation; Creative and Cultural Skills should form part of any such initiative, together with SSCs involved in training and supply of traditional materials, and IHBC is keen to play its part.

38. Overall, there needs be a much better balance between training for new build and work on existing buildings. There needs to be specific recognition of the need for different skills for working on pre-1919 and Traditional buildings, not in terms of a “niche” heritage specialism, but as the bread and butter of many small contractors, and as a major part of the industry as a whole.