

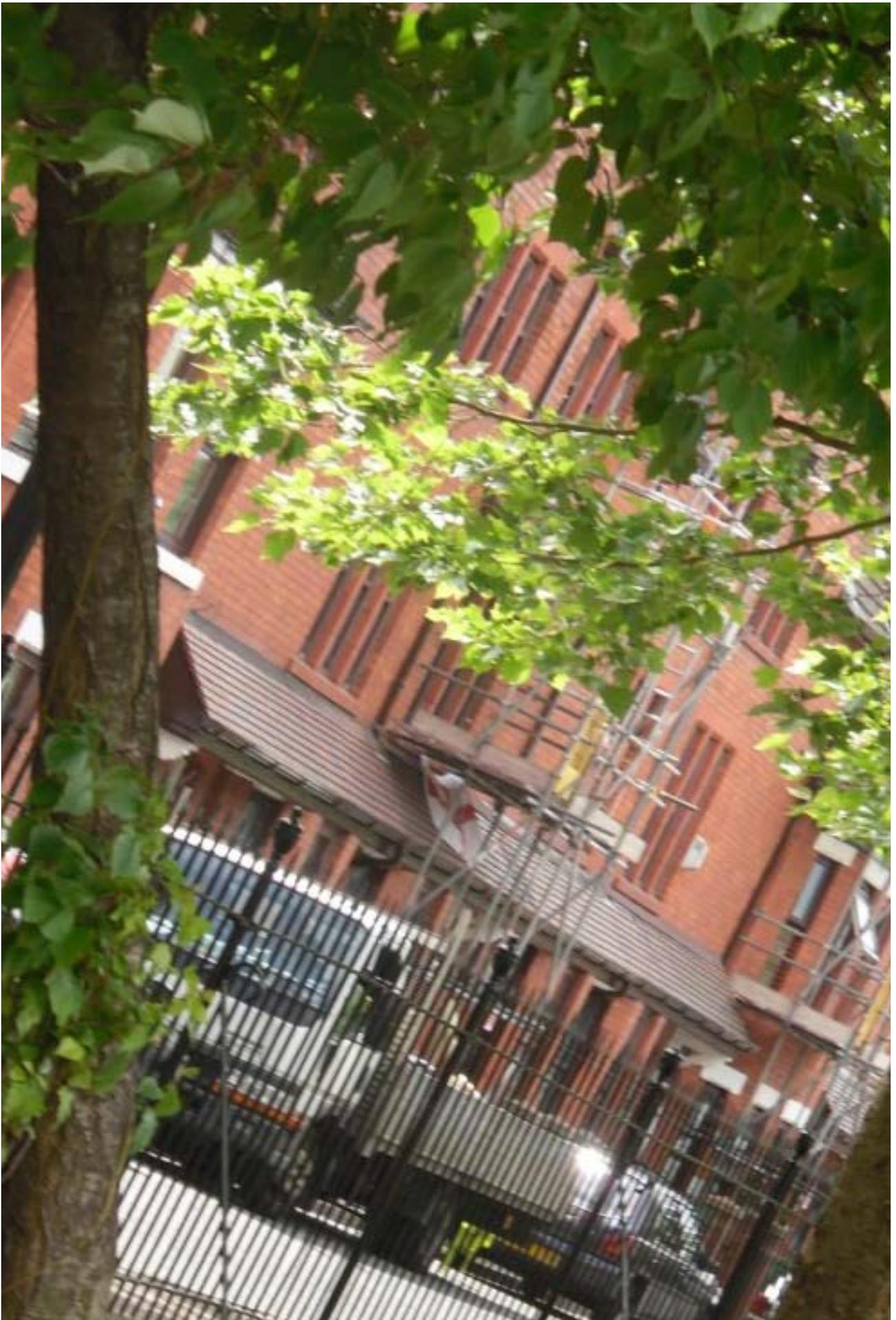
## New Barracks Estate Retrofit

Post Retrofit Evaluative Social Return on Investment



# Contents

Executive Summary	1	7/ Sensitivity analysis	29
1/ Introduction	4	7.1 Removal of New Barracks Co-operative investment	29
1.1 Evaluative Social Return on Investment (SROI) on the New Barracks Estate	4	7.2 Removing the comfort level proxy	29
1.2 Context	5	7.3 Reducing the SROI ratio to 1:1	30
1.4 Scope and timescale evaluative SROI	6	7.4 Summary	30
1.5 Statement on using SROI results	6	8/ Conclusions	32
2/ Inputs and outputs	8	Appendix A:	34
2.1 The investment (inputs)	8	Health working to establish avoided costs to society	34
2.2 Physical results of the works (outputs)	9	Mortality	35
3/ Outcomes	11	Morbidity: falls	36
3.1 Overview	11	Morbidity: Damp and mould growth	37
3.2 Change in energy expenditure	11	Morbidity: mental health and wellbeing	37
3.3 Change in carbon dioxide emissions	12	Morbidity: cardiovascular (CV) or respiratory disease (RD)	38
3.4 Health impacts	12		
3.5 Change in comfort levels	14		
3.6 Benefits for suppliers	15		
3.7 Increased tax receipts	15		
3.8 Value of housing stock	16		
3.9 Benefits for Salix Homes	16		
3.10 Worker hours and maintenance savings after retrofit	16		
3.11 Community effects	17		
3.12 Spin-off projects	17		
3.13 The varied nature of experiences	18		
4/ The impacts map	20		
5/ Additionality	25		
5.1 Deadweight, displacement, attribution and drop-off	25		
6/ The social return on investment calculation	27		
6.1 Monetised benefits	27		
6.2 Value added, present value and SROI ratio	27		



## Executive Summary

# ARUP



Salix Homes, the Salford-based arms length management association (ALMO) commissioned Arup to evaluate the social return on investment (SROI) arising from retrofit works to houses on the New Barracks Estate, Salford, UK.

In the summer of 2010, Salix Homes initiated an estate-wide retrofit works programme on the New Barracks Estate. This included; improving heating and insulation, installing double-glazed windows, fitting new bathrooms and kitchens and rewiring 78 properties to bring them up to a Decent Homes Plus standard.

This evaluative SROI study has been prepared to tell the story of change resulting from the investment in the low carbon retrofit programme across the New Barracks Estate, Salford, 12 months after the retrofit's completion

### Social Return on Investment (SROI)

SROI is a technique which describes and, where possible, quantifies (using money as a unit of measurement) the impacts of an investment on society. The technique is based on a cost-benefit approach which uses financial proxies to demonstrate wider benefits to society, which conventional techniques will often overlook. This study applied a standard SROI framework approach, developed for The Cabinet Office<sup>1</sup>, to the New Barracks Estate's retrofit.

The aim of the study was:

*To establish, map, measure and where possible monetise social, economic and environmental value created by the Salix retrofit programme across the New Barracks estate.*

The study forecasts impacts over a 20-year period, starting in 2010, when retrofitting works commenced. There are two critical outputs from this study:

1. The impacts map – a detailed account of those stakeholders involved in the project, the nature and scale of their inputs, and benefits accruing from the process.
2. The SROI ratio – This comprises the aggregated social benefits over the 20 year period, and converts them into a present day value. The present day value is then expressed as a ratio to the investment called the SROI Ratio.

<sup>1</sup> Cabinet office of the third sector; A Guide to Social Return on Investment, May 2009; available at: <http://www.neweconomics.org/publications/guide-social-return-investment>

## Stakeholders, investment and Changes

A key part of an SROI appraisal is identification of the stakeholders. Stakeholders are defined as those groups that affect, and are affected by, the particular investment.

Investment on the New Barracks Estate retrofit project predominantly relates to time (as an employee or volunteer) or money. For this study, the following stakeholders were identified as:

- New Barracks estate tenants
- the New Barracks Co-operative
- Salix Homes
- Salford City Council
- UK Government
- equipment suppliers and installers
- the environment
- the wider economy
- utilities companies

The total quantifiable value of the total retrofit project was calculated to be £1.9m. This included all expenditure on the project in year one and maintenance of some equipment over its operational lifetime. Approximately 90% of this investment came from Salix Homes; with the remainder contributed by tenants and the New Barracks Co-operative.

## The benefits

The aggregated monetised value of benefits to all relevant stakeholders was found to be £3.4m. This gave a total social value-added (difference between the investment and the total social benefits) of £1.58m. The most significant benefits were realised by the tenants and the companies installing and supplying the equipment. Benefits to these stakeholders over the 20 year period were estimated to be £0.9m and £1.7m respectively.

## Present value and the SROI ratio

Expressing the benefits as their present value<sup>2</sup> after discounting gave a social benefits present value of £3m from a £1.9m investment. This produces a net present value added of £1.1m. The SROI ratio was therefore calculated to be 1.58:1, or, at least £1.58 of social value has been created for every £1 invested by Salix Homes.

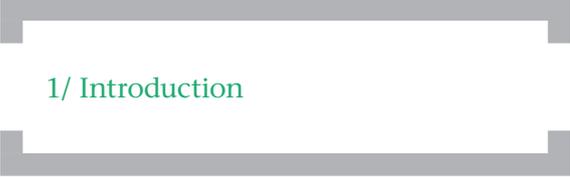
The £1.58 of social value has been created in the form of energy bill savings, income for business, reduced CO<sub>2</sub> emissions, employment creation, avoided health costs to society, increased government tax revenue and saved maintenance time.

It should be noted, that this final figure as with all SROI calculations, is an underestimation of the true social value created. Calculations only included those benefits that could be monetised using financial proxies. Those social benefits that could not be valued in monetary terms, for example improved environmental awareness, community cohesion or impetus for other related projects. These are just as important (some may consider them more important), but are not represented in the SROI ratio or the value added figures.

However, this study indicates that through investment in the New Barracks Estate low carbon retrofit, a viable social investment has been made which has created a significantly higher value than the investment itself. It also proves that in social terms this has been a worthwhile investment.

---

<sup>2</sup> discounted year-on-year at a rate of 3.5%, as recommended by the Government Green Book on assessment



1/ Introduction

## 1/ Introduction

### 1.1 Evaluative Social Return on Investment (SROI) on the New Barracks Estate

This evaluative SROI study has been prepared to tell the story of change resulting from the investment in a low carbon retrofit programme across the New Barracks Estate, Salford, 12 months after the retrofit's completion.

In the summer of 2010, Salix Homes initiated an estate-wide retrofit works programme on the New Barracks Estate. This included; improving heating and insulation, installing double-glazed windows, fitting new bathrooms and kitchens and rewiring 78 properties to bring them up to a Decent Homes Plus standard

The SROI uses a methodology developed for The Cabinet Office<sup>3</sup> which follows a six stage approach, the stages are detailed below:

1. Establishing scope and identifying key stakeholders - this stage establishes the boundaries of the study by examining at the individuals and/or organisations originating the impacts, and those groups or individuals affected.
2. Mapping outcomes - this stage describes the "theory of change". Throughout this stage an illustrative Impacts Map is developed, to detail inputs<sup>4</sup>, outputs<sup>5</sup> and outcomes<sup>6</sup>.
3. Evidencing outcomes and ascribing a value - this is the data collection stage of the SROI process. This SROI study has used surveys, interviews, consultation and desk-based research.
4. Establishing impact - following acquisition of evidence of outcomes, and ascribed monetary values, those aspects of change that would have happened irrespective of the retrofit investment, or as a result of other factors, are eliminated from consideration.
5. Calculating the SROI -this stage involves calculating all benefits, subtracting any disbenefits, and comparing the result to the investment.

6. Reporting, using and embedding -this step involves sharing findings with stakeholders and responding to their comments, plus embedding good outcomes processes and verification of the report.

The data for SROI was gathered through a number of methods including research carried out for, and detailed in, the supporting Measuring Change study (Arup, 2012). Information sources included:

- an estate-wide questionnaire sent to 78 properties resulting in a 33% return rate.
- tenant gas bill data (21% return rate from the estate)
- tenant electricity bill data (17% return rate from the estate)
- eight tenant interviews – tenants were interviewed as part of the pre retrofit study
- an interview with the Head Administrator of the New Barracks Co-operative Tenant Management Organisation (TMO)
- consultation with Salix Homes' Head of Property Services
- internet based research
- existing studies on fuel poverty.



<sup>3</sup> Cabinet office of the third sector; A Guide to Social Return on Investment, May 2009; available at: <http://www.neweconomics.org/publications/guide-social-return-investment>

<sup>4</sup> The contributions of each stakeholder, required to instigate and achieve the eventual outputs and outcomes. In this case, inputs related mainly to direct investment of time and money.

<sup>5</sup> Quantified (forecast or actual) results relevant to each stakeholder arising from the inputs. In this case, outputs relate to the results of retrofit investment/works themselves, such as new boilers, insulation etc.

<sup>6</sup> What the SROI is designed to measure. These are the effects of the outputs as identified by the relevant indicators of social value. In this case, outcomes relate to reduced energy bills, improved comfort etc.

## 1/ Introduction

### 1.2 Context

Salix Homes is an Arms Length Management Organisation (ALMO), based in Salford. In 2010, Salix Homes implemented a low carbon retrofit programme across the New Barracks Estate, Ordsall, Salford. Salix saw this programme as an opportunity to engage with tenants, assess energy use/behaviours pre and post retrofit and to articulate and (where possible) monetise the wider social impact.

Housing on the New Barracks Estate comprises 78 early Edwardian properties. Household make-up across the estate is varied in terms of numbers of residents and age profile. Properties on the estate are managed by the New Barracks Co-operative TMO.

In 2009, 54% of the people in this area were suffering from income deprivation; 28% were dependent on benefits and the average annual household income was approximately £20,000<sup>7</sup>. People living in this area also suffered from significant health problems with only approximately 55% considering themselves "In Good Health" and just over 15% of the people claiming incapacity benefit or disability living allowance.

Prior to the retrofit works properties generally had inadequate heating systems poor or inoperable controls and limited insulation. Evidence of mould growth was apparent in bathrooms, kitchens and end terrace walls due to surface condensation. Windows were generally single glazed and ventilation to the bathrooms and kitchens was through wall mounted extractor fans, many of which were inoperable.

The low carbon Decent Homes Plus programme included boiler replacement, double glazing installation, internal insulation of external walls, installation of mechanical ventilation system, new bathrooms, new kitchens, re-wiring and new front doors. In September 2011, Arup was commissioned to undertake an evaluative SROI study to review and analyse the first 12-month period following completion of these retrofit works.

This evaluative SROI forms part of a series of assessments carried out for New Barracks Estate; parallel studies (listed below) examine retrofit options appraisal and tenant surveying / engagement.

### 1.3 Previous and supporting studies

To date, Arup, on behalf of Salix Homes, has conducted a number of studies on the New Barracks Estate. Specifically these previous studies were:

- a low carbon Retrofit Options Appraisal study (Arup, 2009)
- pre retrofit Measuring Change (Arup, 2010)
- pre retrofit forecast Social Return on Investment (SROI) report.

The Retrofit Options Appraisal produced Standard Assessment Procedure (SAP) calculations for combinations of retrofit interventions in terms of energy saving potential, capital cost and carbon savings. Recommendations were then made relating to types of retrofit interventions most suited to the aims of the New Barracks Estate retrofit programme.

The pre retrofit Measuring Change 2010 study was carried out to determine tenant perceptions of living conditions and comfort levels pre retrofit and annual average energy consumption across the estate pre retrofit. Data was collected in March 2010 by an incentivised estate wide tenant questionnaire which was mailed directly to tenants. A return rate of 68% was achieved for this survey. Further data was gathered through in-depth interviews with tenants from a cross section of the estate's households. Key findings from the Measuring Change research included pre retrofit household energy use and annual expenditure averages of:

- 17,668 kWh of gas used per year
- £624 spent on gas per year
- 3,145 kWh of electricity used per year
- £408 spent on electricity per year

Tenant perceptions of comfort in living rooms and the whole house averaged at a neutral score of 3.5 on a scale of 1-7, where 1 was uncomfortable and 7 comfortable.

<sup>7</sup> Salix Homes. 2009. Ordsall and Islington Neighbourhood Profile. Available at: <http://www.salixhomes.org/2445.htm> [accessed June 2010].

# 1/ Introduction

The SROI analysis gave a greater understanding of the value created by investment in the improvement works. The extensive SROI impacts map established a range of stakeholders. Impacts were identified and mapped including: reduced bills for tenants, improved comfort levels, and increased environmental awareness for the tenants, fewer complaints for the TMO, increased value of housing stock for the Council, increased expenditure in the wider economy and reduced CO<sub>2</sub> emissions in the environment. Some disbenefits were also identified, like temporary disturbance from the works to the tenants. Where appropriate, financial proxies were used to quantify the outcomes and any assumptions were also detailed. These were used to calculate the SROI ratio which was estimated to be 1.6:1, ie. for every £1 invested in the New Barracks Estate retrofit project there was £1.60 of social value created.

## 1.4 Scope and timescale evaluative SROI

The principle aim of the present evaluative SROI is:

*To establish, map, measure and where possible monetise social, economic and environmental value created by the Salix retrofit programme across the New Barracks estate.*

The scope of the SROI is shown in Figure 1. The stakeholders assessed include the tenants and Salix Homes themselves plus indirectly affected stakeholders such as the Government and the environment. The purpose of the analysis is to establish linkages and assign values to the impacts caused as a result to the investment in retrofit.

The SROI is measured over a 20 year period. This reflects the lifespan of typical building engineering technologies. Boilers and windows for example will be expected to last this amount of time whereas some, such as the insulation, may last longer.

## 1.5 Statement on using SROI results

The purpose of SROI analysis is to demonstrate the creation of value by mapping outcomes and expressing (where possible) the effects in a common unit of money. Money is used as an indicator of benefit (or disbenefit) and value created (or destroyed). A demonstrable financial return will not necessarily accrue to every outcome.

SROI analysis seeks to understand and tell the story of change. Direct comparisons should not be made with other studies as assumptions and circumstances vary significantly. Furthermore, the SROI ratio should not be reviewed independently of the Impacts Map which explains in detail, the linkages and the narrative of the change process.

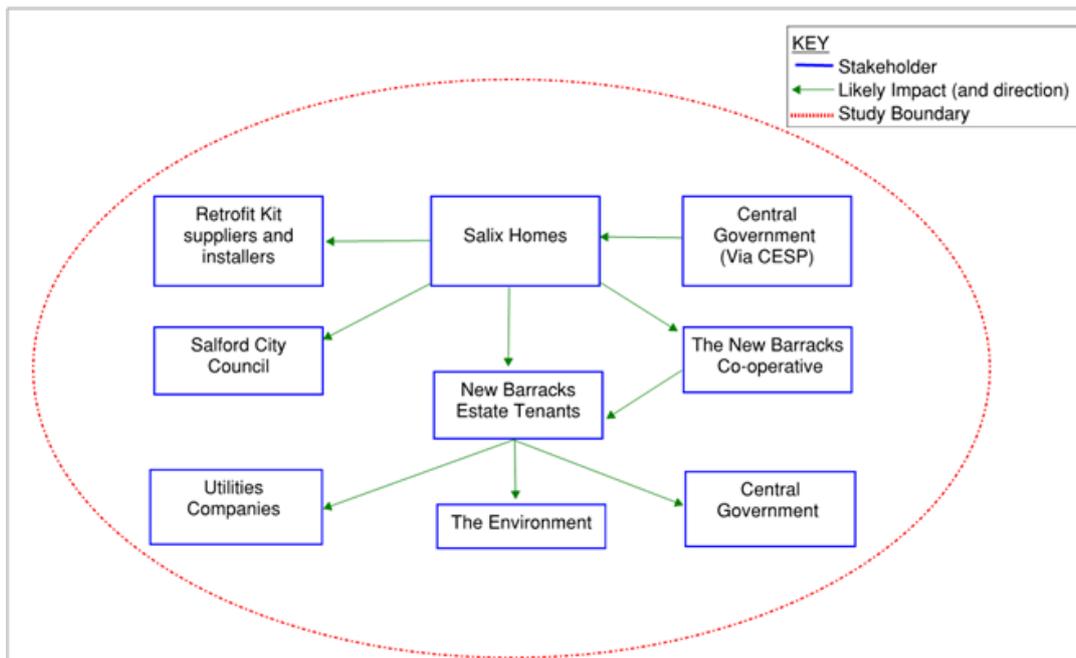


Figure 1: Showing the relationship between stakeholders and the scope of the SROI analysis



## 2/ Inputs and outputs

## 2/ Inputs and outputs

### 2.1 The investment (inputs)

The investment made in 2010 by Salix Homes and the New Barracks Cooperative in the New Barracks Estates summarised below.

<b>Salix and New Barracks Co-operative Investment in the retrofit works - New Barracks Estate</b>	
Wall Insulation	£600,000
Windows	£312,000
Boilers / heating equipment	£224,000
Kitchen refurbishment	£300,000
Bathroom refurbishment	£129,600
Disturbance allowance for tenant redecoration	£19,500
Worker Fees (installation etc.)	(included above)
Salix employee fees on this project	£187,860
<b>Total</b>	<b>£1,772,960</b>
<b>Tenants Investment</b>	
Total additional redecoration required	£14,640 <sup>8</sup>
<b>New Barracks Co-operative Investment</b>	
Full Time Employee cost on project	£4,100
Volunteer Time Spent on project	£3,075 <sup>9</sup>
Disturbance allowance	£15,000
Mechanical Ventilation with Heat Recovery (MVHR)	£100,000
Skip Hire	£1,000
MVHR Maintenance (estimated aggregated cost over time)	£18,000
<b>Total</b>	<b>£141,175</b>
<b>TOTAL INVESTMENT:</b>	<b>£1,928,775</b>

Table 1 Summary of investment

Table 1 shows the scale and sources of the investment. Not detailed (but shown in the Impacts Map) is the time contribution of stakeholders.

With approximately 90% of the total £1.9m investment made by Salix Homes, the remainder comprising the tenants' redecoration payments (after the Salix and New Barracks Co-operative disturbance allowances have been taken into account) and the New Barracks Co-operative investment.

The majority of the investment arose during Year 1 of the works with the exception of the MVHR maintenance will be required for each year of the equipment's lifetime.

<sup>8</sup> Based on estimates relating to redecoration detailed in the impacts map

<sup>9</sup> Cost equated from FTE wage and number of volunteer hours

## 2/ Inputs and outputs

### 2.2 Physical results of the works (outputs)

In SROI analysis, the outputs of an investment or programme of works are the physically tangible results. In this case, the outputs are the specific retrofit measures installed in houses across the estate. Specifically this includes:

- replacing 64 existing boilers with high efficiency boilers
- double glazing all windows in 78 properties
- insulating external walls with 50mm Spacetherm® in 78 properties
- installing mechanical ventilation systems with heat recovery (MVHR) in 73 properties
- 72 new bathrooms
- 75 new kitchens
- 70 properties re-wired
- 78 new doors.

These outputs from the investment will affect each of the stakeholders shown in Figure 1; these effects are the outcomes of the retrofit. Outcomes are the primary concern of SROI analysis, and for the stakeholders affected by the New Barracks Estate retrofit, these are summarised in Section 3.



Above/ Barracks Estate, Salford  
© Salix Homes



3/ Outcomes

## 3/ Outcomes

### 3.1 Overview

Outcomes are central to SROI analysis as they detail what changes as a result of the investment, action or programme. The outcomes assessed in this SROI were:

- changes in tenant energy expenditure
- changes in carbon emissions for the environment
- health impacts on tenants and associated costs saved to society
- impacts on suppliers and job creation
- tenant comfort levels
- government tax receipts
- change in value of Salford's housing stock
- impact on Salix Homes
- maintenance cost savings for the New Barracks Estate Co-operative
- community effects
- spin off projects.

All outcomes are described in the Impacts Map in Section 4 of this report. Only those outcomes that have been quantified will be included in the final SROI ratio calculation.

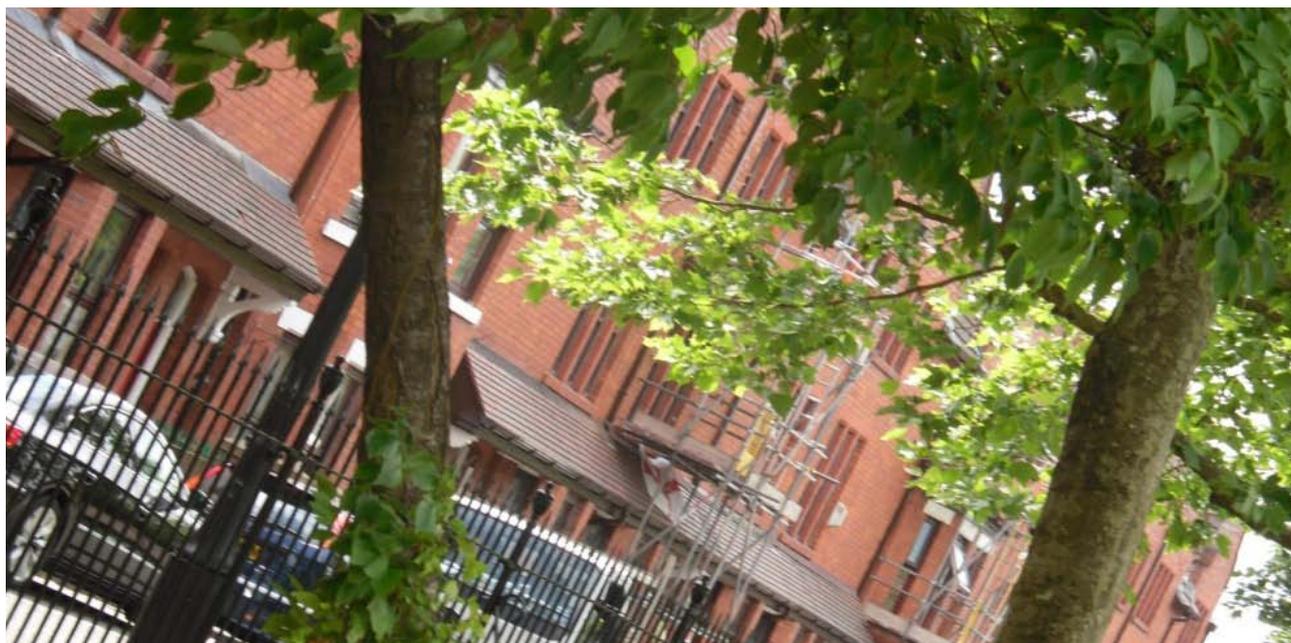
### 3.2 Change in energy expenditure

*Affected stakeholders: tenants, New Barracks Estate Co-operative, utilities companies.*

Changes in tenants' annual energy expenditure resulting from the retrofit works were established through the results of a post retrofit survey on tenants' energy use and expenditure<sup>10</sup>. Average annual savings were calculated to account for energy price inflation in the Measuring Change report for the New Barracks Estate post retrofit. The results are shown below in Table 2.

	<b>Benefit to tenants resulting from bill savings</b>
Gas	£358 per year
Electricity	£-76 (disbenefit) per year

Table 2 observed annual average annual changes in expenditure on energy across the New Barracks Estate



### 3.3 Change in carbon dioxide emissions

*Relevant stakeholders: The Environment.*

Energy Saving Trust conversion factors<sup>11</sup> for grid electricity and natural gas were used in addition to the HM Treasury social cost of Carbon<sup>12</sup> to determine a financial proxy for reduced CO<sub>2</sub> emissions resulting from the retrofit. Average annual savings observed in the Measuring Change survey were used and the calculation is illustrated in Table 3 below.



Energy source	Change (kWh)	Conversion factor (Kg CO <sub>2</sub> e)	Resulting change in emissions (Kg CO <sub>2</sub> e)	Social cost of carbon	Cost of carbon emissions (house)	Cost of carbon emissions (estate)
Grid electricity	599	0.5246	314.24	£80 per tonne		
Or £0.08 per kg	-25.14 (disbenefit)	£-960.83 (disbenefit)				
Natural gas	-8,434	0.1836	-1,548.48		123.88	£9,662.53
<b>Total</b>						<b>£7,701.70</b>

Table 3: Savings in carbon dioxide emissions and resulting monetised benefit to the environment

### 3.4 Health impacts

*Relevant stakeholders: Tenants, wider society / NHS*



Above & above Right/ Barracks Estate, Salford © Salix Homes

Poor housing is known to affect physical health and wellbeing. Further to this, mental health impacts such as stress and anxiety can result directly from a person’s inability to pay energy bills (or through other knock-on financial hardship resulting from high energy bills). There will be a cost to tenants, society and the NHS from poor health. A report prepared for the Bolton<sup>13</sup> Primary Care Trust (PCT) states:

*A life in fuel poverty not only damages health, but also adds to financial hardship and reduces the quality of life for people. It puts additional pressures on health professionals, NHS waiting lists and hospital beds, with significant pressure falling on primary care and emergency care after cold snaps that could be avoided by preventative measures to improve the quality of people’s homes and correspondingly their quality of life.*

(Barker, 2011)

11 Available at <http://www.carbontrust.co.uk/cut-carbon-reduce-costs/calculate/carbon-footprinting/pages/conversion-factors.aspx>

12 Starting at £70 per tonne at 2000 prices and increasing £1 per year to 2010 to £80 per tonne see [www.hm-treasury.gov.uk/d/SCC.pdf](http://www.hm-treasury.gov.uk/d/SCC.pdf)

13 Barker, A. 2011. Assessment of the impact on health and health costs due to fuel poverty in Bolton. NHS Bolton

This report goes on to cite Department of Health statistics which estimates that in the North West alone, excess cold in homes costs the NHS £117m per year.

A Salix Homes study<sup>14</sup> into the Ordsall area states that many people living in Ordsall “significant health problems”, with only 55% considering themselves “In Good Health”. From the interview with the New Barracks Estate Co-operative Administrator the following comments were received about health on the New Barracks Estate:

[the housing pre-retrofit] *must have affected health*

*There are lots of people in this area with very serious health conditions*

*Lots of children with asthma*

[the housing pre-retrofit] *must have improved long-term health....common sense would tell you that it [the health of tenants] must have improved*

The methodology and findings from the Barker report for Bolton, research for Greater Manchester PCTs (Wasielewska et al (2010)<sup>15</sup>) and some of the estate specific findings from the Measuring Change Survey have been used to estimate the health and wellbeing cost savings to society from implementing the low carbon retrofit<sup>16</sup>. The full methodology and list of assumptions is shown in Appendix A. In summary, the financial proxies were arrived at as follows:

1. An assumption was made about a percentage of households on the estate who might be in fuel poverty.
2. Effects of fuel poverty were broken down into:
  - a) morbidity – injury and disease resulting from living in fuel poverty
  - b) mortality – deaths occurring from fuel poverty.

3. Using the findings of the Barker report for Bolton, the likelihood of incidences of morbidity and mortality over the 20 analysis period were assessed applied to the estimated number of people on the New Barracks Estate deemed to be in fuel poverty.
4. These incidences were then monetised using government costing estimates (as outlined in Barker, 2011) typically used to economically assess the effectiveness of health related interventions (this gives a “cost avoided” to society per year).

The figures are likely to be subject to many variables dependent on individual circumstances which have not been accounted for, however as financial proxies for the present study, these proxies were deemed appropriate. The estimated per year savings are summarised below in Table 4.

	<b>Avoided cost to society</b>
Morbidity	£1,494.20
Mortality	£5,000.00
Total	£6,494.20

Table 4: Financial proxies used to measure health savings

14 Salix Homes. 2009. Ordsall and Islington Neighbourhood Profile. Available at: <http://www.salixhomes.org/2445.htm> [accessed June 2010].

15 Excess Winter Mortality in Greater Manchester A Summary of Recent Trends and Local Policy Responses, available at: <http://www.nwph.net/nwph/>

16 For the purposes of this report this is seen as being suitable. The present report did not have the resources to commission surveys and research to find specific detail on health and wellbeing impacts from fuel poverty on the New Barracks estate. Bolton and Salford are both North Western Greater Manchester authorities. We have used statistics for numbers of people in the population suffering certain illnesses as a result of fuel poverty.

### 3.5 Change in comfort levels

**Relevant stakeholder: Tenants.**

At interview the New Barracks Estate Cooperative Administrator described how the housing pre retrofit was so cold it limited tenant’s use of the house; tenants were sometimes confined to one room where the heating was operating. Tenants themselves confirmed this in interviews, and went on to say how parts of their homes (adjacent to windows and leaky doors) would be often be draughty and sometimes let in rainwater. Furthermore, during colder periods breath could reportedly be seen in un-heated rooms.

On the Measuring Change questionnaire tenants were asked about comfort levels in their living room and across their whole house on a scale from 1-7, where 1 was uncomfortable and 7 was comfortable. The results showed that in both cases the average score for whole house comfort and living room comfort was 5.5. This shows a significant two point improvement when compared to pre retrofit (Measuring Change survey) scores which were previously at 3.5 for both the whole house and the living room.

When asked at interview *what would you say is the best thing about the housing since the works* many referred comfort improvements using words and phrases such as *more secure, warmer and comfortable*. Further to this, comments on the Measuring Change study related to *cosiness, the loss of night chills* and houses no longer having an *icy feel*.

Comfort is very subjective and difficult to monetise. There were no existing studies found where change in comfort had been monetised and no obvious way of monetising the change described above through the research. It was decided to benchmark the levels against a properly monetised impact; bill savings. This was logical as bill savings increased as the house got more comfortable through reduced draughts and better heating. In the evidence gathered however, tenants appeared to perceive the comfort change to be more important than the monetary savings on bills (no tenants at interview cited “bill savings” as the *best thing* about their home since the retrofit), so using this as proxy may undervalue this change, it does, however ensure that it is included to some extent in the calculations.

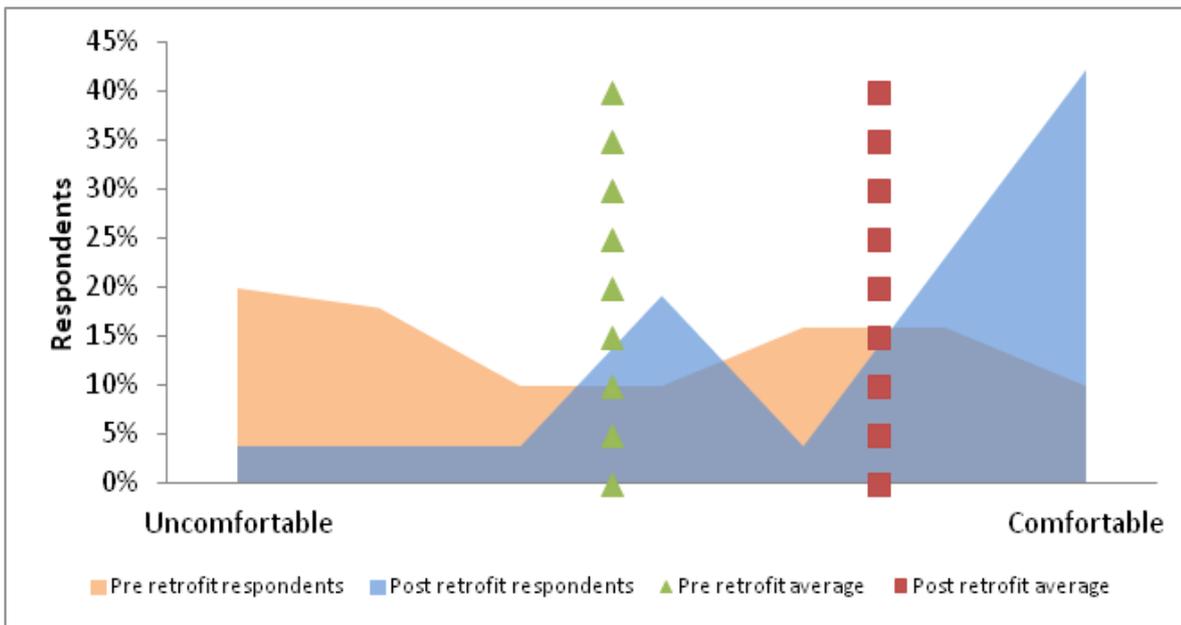


Figure 2 Individual respondents and average pre and post retrofit living rooms comfort levels

### 3.6 Benefits for suppliers

#### 3.6.1 Direct effects

All relevant expenditure on the project will contribute to the financial performance of firms employed (directly and indirectly) on the project. This represents a social and economic benefit as this will increase the viability of the firms and enhance their ability to secure similar work in the future.

#### 3.6.2 Job creation

##### Gross employment

During the construction phase of the retrofit a number of full-time equivalent (FTE) construction jobs were likely to have been created. Estimated job creation is based on the capital cost of the programme and Gross Value Added (GVA) per average construction job<sup>17</sup> in the UK (estimated by dividing total GVA in a given area by total employment). From the two figures above, the following calculation has been applied:

$$\text{Construction Job Years} = \frac{\text{Capital Cost of the Project}}{\text{GVA per Construction Worker}}$$

It is assumed that ten construction job years equate to one FTE employee. The above figure has therefore been divided by ten to arrive at the number of FTE construction jobs created by the investment.

##### Net employment

Additionality ensures that the net, rather than gross impact is taken into account by factoring in external aspects which might affect the economic effects of the proposed development. Additionality considers:

- Leakage – those effects beyond the immediate area of the proposed development. Specifically this will include jobs created but filled by people outside the local area.
- Displacement – deductions which account for the extent to which the benefits of the project are offset by changes in economic activity elsewhere. Specifically this might include a factor to account for risks to other local businesses.
- Economic multipliers – taking account of the economic effects beyond the proposed development such as capital expenditure which leads to job creation which in turn leads to further employment.

<sup>17</sup> For the particular work being carried out for the low carbon retrofit GVA per worker in "Building Completion and Finishing" (SIC 43.3) was used, as this type of work was considered to be most similar to work being carried out on the New Barracks Estate.

Additionality factor values for each aspect are outlined below. These are best estimates from English Partnerships<sup>18</sup> (now part of the Homes and Communities Agency) guidance on additionality. The development is considered to be one of local/ neighbourhood importance.

Additionality aspect	Factor	Additional information
Leakage	25%	A reasonably high proportion of the benefits will be retained within the target area
Displacement	0%	Not relevant
Economic Multipliers	1.1	Average local linkages

Table 5: Additionality assumptions

These calculations indicate that five FTE jobs were created as a result of the investment. A financial proxy was worked out by using the UK average wage for a labourer (in Manchester on £7.05 per hour<sup>19</sup>) for 37.5 hours pay week for 252 days (ie.FTE hours).

### 3.7 Increased tax receipts

**Relevant stakeholder:** Central government

Value Added Tax (VAT) is charged on most expenditure in the UK. VAT rates are 5% for energy saving products, 5% on domestic energy and 20% standard rate.

Prior to the retrofit programme, the Government received VAT income from tenant expenditure on energy (VAT at 5%). Since the tenants are now saving money on their bills, it is assumed they will spend this saving on non energy related goods/services. As the level of VAT on domestic energy is less than the standard rate of VAT, this represents an increase in revenue for Government – ie. the difference between what they would have received (5% on energy expenditure) and what they will receive in future (20% on other expenditure).

VAT will also be charged on equipment, installation and decoration; this has been accounted for in the SROI calculation.

<sup>18</sup> English Partnerships (2008) Additionality Guide, A Standard Approach to Assessing the Additional Impact of Interventions; Third Edition, downloaded at <http://www.offpat.info/Publication.aspx?ID=2536>

<sup>19</sup> Using the Salary Calculator at <http://career-advice.monster.co.uk/salary-benefits/pay-salary-advice/salary-calculator/article.aspx>

#### 3.8 Value of housing stock

*Relevant stakeholder: Salford City Council*

It is assumed that a benefit of the retrofit will be the increased value of properties on the estate as they are now better equipped and more desirable to live in. Salford City Council owns the properties and as such this benefit would accrue to the Council.

The market price of a house is unknown prior to its sale however its value can be determined by rents which can be charged/earned<sup>20</sup>. The increased value could be calculated by estimating increased rents which the owners can reclaim as a result of investment. Since the houses concerned are classed as social housing, it is assumed that there is no increase in the rents and, as such, there will be no significant immediate increase in value of the housing stock.

#### 3.9 Benefits for Salix Homes

*Relevant stakeholder: Salix / New Barracks Cooperative*

At interview, Matt Roberts (Head of Property Services at Salix Homes) outlined the benefits from the retrofit works to Salix Homes. The positive outcomes for Salix Homes were numerous but could not be monetised; consequently these have been qualitatively detailed below and in the Impacts Map (Section 4).

Improved reputation through the possible award of national accolades for Salix Homes' activities, plus local and national press coverage (of which there are already examples including announcements and visits of MPs and the Energy Minister) was noted. This allowed Salix to build their reputation as "more than just an ALMO" and to demonstrate that they are going beyond repairs and maintenance, and looking at issues such as Fuel Poverty and energy use in a proactive and holistic way. The New Barracks Estate scheme, in the opinion of Salix Homes' senior management, has been a catalyst for action, demonstrating a willingness to move beyond housing provision and to initiate other similar projects.

This shift in focus was also related to internal awareness-raising of the range of issues that the New

Barracks project identified. This led to behavioural changes in staff, and further to this Salix Homes now has a permanent employee whose role is to project-manage energy efficiency as well as qualified energy advisors.

Access to finance (grant funding) is also a positive outcome for Salix Homes. Community Energy Saving Programme (CESP) funding supported the works on the New Barracks Estate and other applications for project finance have also been submitted by Salix Homes using the New Barracks work as a clear example of innovation in terms of Fuel Poverty and energy efficiency.

Experience gained on the current project will also provide a valuable foundation for future projects. The New Barracks work was a completely new type of project for Salix Homes, and the ability to learn from this project, and replicate the work in the future, is highly beneficial.

#### 3.10 Worker hours and maintenance savings after retrofit

*Relevant stakeholder: Salix / New Barracks Cooperative*

It is likely that, as a result of the retrofit, Salix Homes and the New Barracks Co-operative will experience a fall in complaints and reduced number of repairs relating to the housing stock. This will represent savings in worker hours which can be put to use elsewhere. No updated information was available on this outcome, and the forecast SROI assumptions were therefore carried forward.

##### **Benefit to Salix Homes.**

There will be reduced requirement for repairs as fewer complaints are received from tenants due to damp, inefficient or poorly heated/insulated homes. During consultation with Salix Homes it was stated that this was too early to quantify, but that the level of reported incidents of condensation and boiler repairs has already decreased.

<sup>20</sup> W. Kuckshinrichsetal./Energy Policy 38 (2010) 4317–4329.

### Benefit to the New Barracks Co-operative

The following figures for repairs in 2009/10 were obtained from the New Barracks Co-operative.

Repairs	Quantity	Total Cost for Year
Electrical jobs	6	£88
Windows	3	£47
Kitchen	8	£136
External Doors	6	£131
Damp in floors	2	£16
Bathroom	34	£675
Total for year	59	£1,093

Table 6: Repair costs and quantities for the New Barracks Co-operative for 2009/10

In addition to the costs above, wages were paid to a handyperson to carry out repairs. An average wage of £10/hour was paid for the New Barracks handyperson plus £7 per hour for an assistant, when required. Minor repair jobs took, on average, 1.5 hours to complete. It was estimated that one third of jobs involved the handyperson-plus-assistant (at an average cost of £25.50 per job) with two thirds undertaken by the handyperson alone (£15 per job). The costs in wages are summarised below in Table 7.

	Number of Jobs	Rate per job	Total Cost
Handyperson	39	£15	£585
Handyperson + Assistant	20	£25.5	£510
Total Cost for year			£1,095

Table 7: Labour costs associated with repairs in 2009/10 (New Barracks Co-operative)

This results in estimated total cost of repairs for the New Barracks Estate for 2009/10 of £2,188. It is assumed that this is the amount that will be saved due to the retrofit.

### 3.11 Community effects

*Relevant stakeholder: Salix / New Barracks Cooperative*

During the interviews some tenants spoke about the positive effect the works had on the community. There was a cohesive effect on the community during the works with people who might not normally have spoken to each other mixing and sharing their experiences of the progress (positive and negative). This effect has been documented, but not monetised.

### 3.12 Spin-off projects

The retrofit project has, in some respects, been a starting point on a journey for the wider New Barracks Estate and individual tenants. Other projects and individual actions designed to either save money on bills or reduce carbon dioxide emissions, or generally improve the estate (through landscaping and planting) have been taken forward. For individuals this has included simple actions such as insulating individual radiators (using foil behind the radiators) and using energy-efficient light bulbs.

For the wider New Barracks Estate the following schemes are being taken forward or the feasibility is being examined:

- Solar photovoltaics scheme for the estate – feasibility for this is being explored. At interview it was stated that whilst the estate would like the scheme to go forward, there was doubt surrounding the financial viability, due to questions around Feed in Tariffs.
- In Bloom – this is a garden on the estate being part funded by external sources (Procure Plus – Sense of Place) and the CESP community fund to commemorate the New Barracks Estate Retrofit programme. This – it is thought – will contribute to the visual amenity of the local area. At the time of writing details were not available.

### 3.13 The varied nature of experiences

It is important to note that this work is trying to take account of effects across the whole estate, including negative aspects associated with the works. Some direct quotes are listed in Table 8 below, which is taken from the Measuring Change report.

Positive	Negative
I think the insulation and gas boiler have made most difference	<u>Adjoining houses</u> both sides are not insulated nor have received decent homes
~	~
I believe I am <u>healthier and happier</u>	Envirovent <u>hard to monitor</u> some noise now and again
~	~
It has not changed the way I live but has made me feel <u>more secure and comfortable</u> and think more about the energy use than I did before	The ventilation is terrible when we a shower the <u>condensation runs down the walls</u> and the kitchen windows steam up when cooking
~	~
We are now draught free! The noise outside is less with the new windows and it feels a lot warmer.	Bathroom has not been insulated. Bathrooms were to be insulated as always cold even in summer, <u>freezing in winter pipes freeze up</u> every year so no improvement at all in bathroom worse if anything
~	~
The house is much warmer and draft free	Hasn't really changed the <u>coldest room is the bathroom</u> - it's always freezing
~	~
No more draughts coming from the windows or doors - no icy cold kitchen or bathroom either	Nothing has changed in the <u>kitchen still have got the damp</u>
~	~
Whole house has lost its chilly feel. I'm not having to put the heating on as much and doesn't take as long to warm up when I do	
~	
The house is still as warm when I don't have the heating on	
~	
I have found a big improvement in all the work that has been done in particular the doors and windows.	
~	
House much warmer apart from bathroom	
~	
There is no change in the way I live a bit more cosy	

Table 8 Tenant comments on comfort and living conditions

From accounts gathered throughout the interview stages it seems individual experiences of the works themselves, and the operational retrofitted housing, varied across the estate. Negative comments were made about mechanical ventilation equipment being noisy and not working as it should, while other negative comments related to kitchens and bathrooms being cold compared with the pre retrofit house. Learning from the project has emphasised the need to ensure advice and guidance is available post retrofit to ensure residents understand the need to change behaviours and effectively use new technologies.



#### 4/ The impacts map

#### 4/ The impacts map

The impacts map for the Salix Homes Retrofit works programme is set out below. Stage 1 lists the stakeholders and the likely predicted changes for each of them. Stage 2 records the inputs and the direct outputs, which are a consequence of the inputs. Stage 3 summarises the outcomes and provides a concise summary of likely changes, their anticipated duration and an approximation of the monetised values, if a proxy is available.

Table 9: The Impacts Map

Stage 1		Stage 2			Stage 3								
Stakeholders	Intended / Unintended Changes	Inputs		Outputs	The Outcomes (what changes)								
Who do we have an effect on? Who has an effect on us?	What will change for them?	What do they invest?	Value	Summary of Activity in Numbers – for whole project	Description	Indicator	Source	Quantity	Duration	Financial Proxy	Value £	Source	
					Describe the change	Measure the change	Where did you get the info from?	How much change was there?	How long does it last?	What proxy would you use to value the change?	What is the value of the change?	Where did you get the information from?	
New Barracks Estate	Reduced Bills Increased disposable income Improved comfort in winter Healthier living conditions / Reduced risk of cold related health problems Improved awareness regarding energy use Redecoration of household Community cohesion (No unintended changes reported)	Time (Disturbance, clearing furniture, moving out, arranging day to allow worker entrance etc.) Money for redecoration in addition to the disturbance allowance	6-7 week estimated time of works - this will impact on day-to-day life of tenants in varying amounts. Some interviewees described how they would like to be at their property at the beginning and end of the day - estimate one hour a day minimum (35 hours) - to totally moving out - 6 weeks  One interviewee stated that £105 per room was the cost involved for redecoration. Other tenants stated that the allowance was sufficient.	<ul style="list-style-type: none"> <li>• Replacing 64 existing boilers with high efficiency boilers</li> <li>• Double glazing all windows in 78 properties</li> <li>• Insulating external walls with 50mm Spacetherm® in 78 properties</li> <li>• Installing mechanical ventilation systems with heat recovery affecting 73 properties</li> <li>• 72 new bathrooms</li> <li>• 75 new kitchens</li> <li>• 70 properties re-wired</li> <li>• 78 new doors</li> <li>• Reduced carbon footprint</li> </ul>	Changed bills / expend on energy & increased disposable income	Change in bills from bill analysis	Arup Measuring Change study	Across 78 properties	20 years	Actual observed annual average	£358 on gas  £-76 on electricity  For an average house on the estate	Measuring Change programme	
					Both of the above are assumed to be the same - will be counted once.	Healthier living conditions / Reduced risk of cold related health problems	Effects on health were monetised using Barker (2011) method  See appendix A	Barker (2011) The Salix Homes Document Ordsall Neighbourhood Profile (February 2009)	Across around 44% of the estate (see health section)	20 years	Morbidity and mortality costs to society	Morbidity: £1,494.20 per year  Mortality: £5,000.00 per year  (value is felt by society)	The Salix Homes Document Ordsall Neighbourhood Profile (February 2009) Barker (2011)
					Improved comfort levels	See Measuring Change report and example graph shown on Figure 2	Measuring Change Survey – Arup, 2012	78 Properties	20 years	This was deemed to be most important changes for the tenants, more so than bill savings – the same “value” as the bill saving was used as a financial proxy	Benchmarked against the change in bills	Measuring Change study	
					Temporary day to day disturbance of the works	This is a temporary and unquantifiable effect.	Tenant interviews	At interview most reported inconvenience but those reporting significant inconvenience reported a serious affect on their day-to-day life.	7 weeks	n/a	n/a	n/a	

4/ The impacts map

Stage 1		Stage 2			Stage 3							
Stakeholders	Intended / Unintended Changes	Inputs		Outputs	The Outcomes (what changes)							
Who do we have an effect on? Who has an effect on us?	What will change for them?	What do they invest?	Value	Summary of Activity in Numbers – <b>for whole project</b>	Description	Indicator	Source	Quantity	Duration	Financial Proxy	Value £	Source
					Describe the change	Measure the change	Where did you get the info from?	How much change was there?	How long does it last?	What proxy would you use to value the change?	What is the value of the change?	Where did you get the information from?
					Expenditure for redecoration.	£105 per room was assumed. The average number of rooms affected was estimated to be 6 per household, across 78 properties.	Previous Tenant Interviews.	78 properties (equal to number of properties having wall insulation which is assumed to be the main reason for redecoration) One tenant was quoted £105 per room. 78*6*105 = £49,140	Until redecoration is complete – specific to each tenant	Number of properties having full decent homes treatment and number of rooms needing decoration x 105	Total value of works: £49,140 ( In the SROI calculation this is an aggregate disbenefit to the tenants who ultimately pay an estimated £14,640 or 30% of this bill)	Salix Homes / Tenant Interview Stage
					Increased energy/carbon/ environmental awareness. This may lead to more energy conscious behaviour and reduced bills in the future.	Not quantifiable	n/a	All tenants in properties having some retrofit works may experience some amount of increased awareness about the association of energy use, carbon emissions and savings on bills.	Not quantifiable	n/a	n/a	n/a
NHS / Salford PCT	Expense required to deal with Fuel Poverty related health issues will fall	n/a	n/a		Healthier people in the PCT catchment area / Reduced risk of cold related health problems	Effects on health were monetised using Barker (2011) method	The Salix Homes Document Ordsall Neighbourhood Profile (February 2009) Barker (2011)	Across around 44% of the estate (see health section)	20 years	Morbidity and mortality costs to society	Morbidity: £1,494.20 per year Mortality: £5,000.00 per year	The Salix Homes Document Ordsall Neighbourhood Profile (February 2009) Barker (2011)
New Barracks Co-operative	Improved HQ and meeting facilities Fewer complaints to deal with re: heating, kitchens, bathrooms etc	Time: Full time Employee Volunteer  Money: MVHR - MVHR (maintenance over 30 years) - Skip hire - Additional disturbance payment	400 hours of full time staff hours at £10.25 (£4,100). 300 hours of volunteer time. (Volunteer time monetised by using the same rate as full time staff to give £3,075)  £100,000 - £18,000 - £1,000 - £200 per house with complete Decent Homes Work		Reduced energy bills from heating, wall insulation and double glazed windows Not quantified.	Not quantified.	Not quantified.	Not quantified.	20 years	Not quantified.	Not quantified.	Not quantified.
					Decrease in time required to deal with complaints and carry out repairs associated with poorly equipped houses (electrics, windows, kitchens, damp etc.)	Based on costs of related maintenance jobs in 09/10 + wages paid to workers.	Consultation with the New Barracks Co-operative.	Cost of repairs in 09/10 = £2,188	Up to 20 years. Note: It is likely that maintenance will be required within this period as the installed equipment depreciates. This may be over estimated as depreciation costs of equipment have not been factored in. This is not considered significant since maintenance is less than 1% of the total aggregated benefits	Repairs in 09/10	£2,188 per year	Consultation with New Barracks Co-operative during the pre retrofit forecast SROI.

Stage 1		Stage 2			Stage 3							
Stakeholders	Intended / Unintended Changes	Inputs		Outputs	The Outcomes (what changes)							
Who do we have an effect on? Who has an effect on us?	What will change for them?	What do they invest?	Value	Summary of Activity in Numbers – for whole project	Description	Indicator	Source	Quantity	Duration	Financial Proxy	Value £	Source
					Describe the change	Measure the change	Where did you get the info from?	How much change was there?	How long does it last?	What proxy would you use to value the change?	What is the value of the change?	Where did you get the information from?
Salix Homes	Fewer complaints due to improved quality of housing Improved reputation	Employee Time (as wages)	£187,860 (lump sum figure - no further details provided )		Improved reputation Through possible awards for innovation and standards of care, and local and national press coverage. This allows Salix to build their reputation as “more than just an ALMO”	Cannot be quantified	n/a	Cannot be quantified	The effect can potentially last indefinitely if Salix maintain works in this field	n/a	n/a	Salix Interview
					Change in Salix culture and help in raising awareness. This has led to staff changes including a permanent employee to project-manage jobs relating to energy efficiency.	Cannot be quantified	n/a	Cannot be quantified	The effect can potentially last indefinitely if Salix maintain works in this field	n/a	n/a	Salix Interview
					Access to finance Finance applications have also been submitted using the New Barracks work as a direct example of Salix innovations.	Cannot be quantified at this stage.  Difficult to relate quantity/ proportion of funding which might come forth on the back of the New Barracks work alone.	n/a	Cannot be quantified	For as long as funding streams relating to energy efficiency remain open.	n/a	n/a	Salix Interview
Firm(s) Supplying and Installing equipment	Income boost, profile raising, maintain employees, increase employee skill base and in some cases refine products to suit housing	Time	Worker time over the course of the works – this has not been quantified.		Increased income Raised profile Increased employee skill base Refine products to suit housing	Direct expenditure. Other aspects are difficult to quantify with the level of information available. This outcome will be underestimated.	Salix Homes	Total expenditure in year one £1,665,600	One year for all apart from Envirovent where maintenance is expected to cost £18,000 over 30 years. This is averaged out at £600 per annum.	Financial data from Salix and the New Barracks Co-operative.	£1,665,600 (year one)  £1,674,600 (with MVHR maintenance factored in)	Salix Homes  New Barracks Co-operative
Employees of the above firms and their suppliers	Gain / retain employment				Gain / retain employment	Employment generation estimations and average incomes for construction works	Based on capital expenditure and previous studies	5 FTE jobs were calculated see section 3.6	Unknown	Average construction worker wages in Manchester	£66,445 (from 5 jobs at £7.05 per hour for 252 days 7.Shours a day.	Previous studies Internet research Consultation

4/ The impacts map

Stage 1		Stage 2			Stage 3							
Stakeholders	Intended / Unintended Changes	Inputs		Outputs	The Outcomes (what changes)							
Who do we have an effect on? Who has an effect on us?	What will change for them?	What do they invest?	Value	Summary of Activity in Numbers – <b>for whole project</b>	Description	Indicator	Source	Quantity	Duration	Financial Proxy	Value £	Source
					Describe the change	Measure the change	Where did you get the info from?	How much change was there?	How long does it last?	What proxy would you use to value the change?	What is the value of the change?	Where did you get the information from?
The Environment	Reduced Carbon Dioxide Emissions	Resources			Decreased CO <sub>2</sub> Emissions	Values for estimated CO <sub>2</sub> savings per annum (by kit type)	Energy Saving Trust	See section 3.3 on page 13				
Salford City Council	Improved value of housing stock	Housing stock	78 houses		Increased Value of housing stock on the New Barracks Estate	Whilst the value of the housing stock will have increased, it cannot be quantified. This is because the changed value of a property to its owner is equal to increased rents which can be claimed, these are assumed to be (see section 4.5)	n/a	Across 78 properties	20 years	Change in rents which can be charged.	£0	Salix
Government	Increased tax revenues (assumed that all money saved will be spent elsewhere on products with higher VAT compared with energy)	Money: Community Energy Saving Programme (CESP) funding to Salix	£292,842		Increased tax revenue All money saved will be spent elsewhere in the economy with higher standard VAT (at 20% in 2011) compared with reduced VAT on domestic energy (5%)	VAT on kit/ installation PLUS VAT on value of money saved on bills MINUS VAT amount they would have received if money was spent on energy (the situation pre retrofit)	Salix	VAT on kit/ installation and extra expenditure	20 years	VAT on money saved by tenants and the Co-op	See section 3.7	Measuring change/Previous Arup study/ HM Government
Utilities companies	Loss of income	n/a	n/a		Fall in expenditure on bills	Loss is equal to tenant saving on bills	Savings from Measuring Change findings	See tenant savings above	See tenant savings above	Savings from Measuring Change findings	Cancel out	Measuring Change study
The wider economy	Expenditure (assumed)	n/a	n/a		Rise in consumer spending	Rise is equal to tenant saving on bills	Savings from Measuring Change findings	See tenant savings above	See tenant savings above	Savings from Measuring Change findings		Measuring Change study

5/ Additionality

## 5/ Additionality

### 5.1 Deadweight, displacement, attribution and drop-off

There are four aspects of SROI analysis which identify the proportion of final outcomes which are not attributable to the actions of individuals or the organisation being studied. These aspects and their assumptions for the present study are summarised below.

#### 5.1.1 Deadweight

Deadweight is the percentage of outcome which would have happened without the actions of Salix. This element is deducted from total outcomes.

For the present study 0% deadweight has been assumed. Without the actions of Salix Homes, none of the retrofit actions would have been taken and the residents would have carried on as normal.

#### 5.1.2 Displacement

Displacement assesses how much of the effect will be displaced (ie. moved from one area to another) by the actions of the programme.

It may be likely that the fall in gas usage (and the corresponding fall in gas expenditure) has led to

some of the increase in electricity usage. This is built into the SROI calculations.

No other displacement is thought to have occurred. This is assumed to be 0% for this study. The outcomes will not, it is assumed, result in other areas or groups of people being better or worse off.

#### 5.1.3 Attribution

Attribution examines how much of the outcome was caused by other organisations.

Within this study some of the outcomes can be attributed to the New Barracks Co-operative which has been instrumental in the delivery of this project. This will already be factored in throughout as the Co-operative is a major stakeholder.

All aspects contributed by the Co-operative have been documented.

#### 5.1.4 Drop-off

Drop-off seeks to assess the impact reduction over-time. A fixed percentage reduction will need to be factored to reflect year-on-year changes.



Above/ Barracks Estate, Salford  
© Salix Homes



6/ The social return on investment calculation

## 6/ The social return on investment calculation

### 6.1 Monetised benefits

All monetised benefits have been aggregated over 20 years, and are shown below in Table 10:

Stakeholder	Net Benefit
Tenants	£898,678
Salix Homes	n/a
New Barracks Co-operative	£49,615
NHS	£129,884
Salford City Council	n/a
Suppliers	£1,723,740
Suppliers' employees	£66,446
The Environment	£154,034
Central Government	£413,247
<b>TOTAL</b>	<b>£3,435,643</b>

Table 10: Summary of monetised benefits

Table 10 shows that the majority of benefits accrue to tenants and equipment suppliers/installers. The total amount of monetised benefits amounts to £3.4m.

### 6.2 Value added, present value and SROI ratio

#### 6.2.1 Value added

Predicted value added over time has been calculated to show the difference between the inputs (i.e. the investment) and the outputs across all the stakeholders. This provides a value added figure of approximately £1.5m over the assessment period of 20 years.

#### 6.2.2 Present value

In line with HM Government's Green Book on appraisal and evaluation<sup>21</sup>, benefits were discounted at a rate of 3.5% to give the present value of the benefits. This expresses the value of the predicted benefits in present day terms.

Discounting is carried out because it is assumed that stakeholders prefer to have benefits today, compared with tomorrow, or at some other time in the future – say in 10 years. This is the time value of money. Discounting is applied to the cumulative benefit for each year to give the present value for each year, the formula is shown below.

$$\text{Present Value (year n)} = \frac{\text{Cumulative Benefit (year n)}}{(1+\text{discount rate})^n}$$

This is carried out for each year of the assessment, in this case 20 years, and the total value is aggregated. This gives the aggregated *present value*. From this the figure, the *net present value added* can be calculated. These figures are summarised in Table 10 below:

	Present Value	Investment	Net Present Value Added
Aggregate Benefits	3,052,500	1,928,775	1,123,725

Table 11: Present value of the investment (after discounting at 3.5%)

The above figures were taken forward to calculate the SROI ratio.

#### 6.2.3 The SROI ratio

The SROI ratio is calculated by applying the formula:

$$\text{SROI Ratio} = \frac{\text{Present Value}}{\text{Value of Investment}} :1 = \frac{£3,052,500}{£1,923,775} :1 = \mathbf{1.58:1}$$

This result illustrates that for every £1 spent on this project, £1.58 of social value has been created in the form of energy bill savings, income for business, reduced CO<sub>2</sub> emissions, employment creation, health benefits, increased government tax revenue and saved maintenance time. This figure represents an understatement of the social value created since some of the benefits summarised in the Impacts Map were not monetised.

<sup>21</sup> Available on line through HM Treasury at [http://www.hm-treasury.gov.uk/data\\_greenbook\\_index.htm](http://www.hm-treasury.gov.uk/data_greenbook_index.htm)



7/ Sensitivity analysis



## 7/ Sensitivity analysis

Sensitivity testing has been undertaken by adjusting the figures detailed throughout this report and re-calculating SROI ratio. This indicates the sensitivity to variations in outcome valuations. If the ratio falls below 1:1, the investment would not be deemed worthwhile in social terms. The sensitivity analysis has been carried out by making the following adjustments:

- removal of New Barracks Co-operative investment
- removing the tenant comfort proxy
- calculating the necessary adjustments to reduce the SROI ratio to 1:1.

Once these individual adjustments have been made, it will be possible to assess the sensitivity of the SROI.

### 7.1 Removal of New Barracks Co-operative investment

Throughout the SROI analysis it has been assumed that there is 0% attribution, as the Salix Homes investment was responsible for all outcomes and resultant knock-on outcomes. Throughout the retrofit programme however, the New Barracks Co-operative has been instrumental in delivering progress. It has also been responsible for part of the retrofit through its own direct funding (i.e. the MVHR). These inputs included:

- employee cost on project
- volunteer Time Spent on project
- disturbance allowance
- MVHR installation and maintenance
- skip hire.

Removal of these investments from the calculations results in knock-on effects on other aspects of the process, including:

- disturbance allowance income (Stakeholder: Tenants)
- income to businesses (Stakeholder: MVHR suppliers)
- CO<sub>2</sub> emissions and bill savings from MVHR (Stakeholder: The Environment and tenants)<sup>22</sup>
- increased VAT receipts from money saved on energy bills and spent elsewhere, money spent on MVHR equipment and maintenance (Stakeholder: Central Government).

By removing these investments from the SROI calculation process, the resultant change in the present value, investment and the SROI ratio can be determined, as shown in Table 12 below:

	Present Value	Investment	Net Present Value	SROI
Aggregate benefits	2,904,861	1,802,600	1,102,261	1.61

Table 12: Present value, NVP and SROI after removal of New Barracks Co-operative Investment

Under the circumstances outlined above, the SROI ratio increases. This is not because the contributions of the Co-operative are detrimental leading to an overall fall in social value creation, but rather because:

- their investment represents 7% of the total
- aggregated benefits fall by 4% without their input (if the environment and bill savings could be disaggregated, this fall would be larger).
- as such the fall in the investment is higher than the fall in the benefits and the higher SROI ratio reflects this.

This indicates that the retrofit still creates significant positive social value, even without investment by the New Barracks Co-operative.

### 7.2 Removing the comfort level proxy

The comfort levels assumed in the calculation were benchmarked against the bill savings (see section 3.5). Removing this proxy completely will remove one of the most important outcomes for the tenants from the calculations. The effects on the SROI ratio are outlined below.

	Present Value	Investment	Net Present Value	SROI
Aggregate benefits	2,727,989	1,928,775	799,214	1.41

Table 13: Present value, NVP and SROI after removal of the comfort level proxy

The above indicates that the retrofit still creates significant positive social value, even without accounting for the change in tenant comfort levels.

<sup>22</sup> The CO<sub>2</sub> and bill savings results from the MVHR could not be disaggregated from the savings shown as these are based on observed averages across the estate

### 7.3 Reducing the SROI ratio to 1:1

In order for the predicted SROI ratio to fall to 1:1, all predicted benefits calculated would have to be reduced (divided) by a factor of 1.58. This is not, however, a credible scenario since many of the benefits are based on actual expenditure or observed changes over a 12 month period.

Reference to Table 10 confirms the scale of this level of investment. Benefits based on direct expenditure comprise income to businesses, and tax receipts to central government. The sum of these benefits equates to nearly half of the total benefits and, assuming that these are fixed, the remaining benefits would have to be reduced to below zero (ie. become disbenefits), for the SROI ratio to fall to 1:1.

### 7.4 Summary

The sensitivity tests show that a good (ie. above 1) social return on investment is predicted, even with significant changes to the inputs and financial proxy assumptions. The alternative scenarios detailed each provide a social return ratio above 1:1, indicating the viability of the project.



Above/ Barracks Estate, Salford  
© Salix Homes



## 8/ Conclusions

## 8/ Conclusions

Expressing the benefits as their present value after discounting indicates a social benefits present value of £3m from a £1.9m investment. This produces a net present value added of £1.1m. From this, the SROI ratio was calculated to be 1.58:1, or in monetary terms, at least £1.58 of social value is created for every £1 invested by Salix Homes. This indicates a viable social investment which creates a significantly higher value than the investment itself.

It should be noted, that this final figure as with all SROI calculations, is an underestimation of the true social value created. Calculations only included those benefits that could be monetised using financial proxies. Those social benefits that could not be valued in monetary terms, for example improved environmental awareness, are just as important (some may consider them more important), but are not represented in the SROI ratio or the value added figures.

The economic, social and environmental effects of the New Barracks Estate retrofit are significant and felt by many different stakeholders. There are lessons to be learned about ensuring benefits are directed towards the most vulnerable in society, if social value creation is to be maximised. These lessons will be pertinent for similar projects in the future, particularly those resulting from the Green Deal.

Suppliers of retrofit equipment and the installation companies are benefiting the most of all the stakeholders. More research into where these benefits are being realised could be investigated further to ensure that social value is being maximised. Anecdotal evidence from Salix Homes (relating to other retrofitting programmes) suggested that specialist labour for retrofit could not be sourced locally, and as such workers had to be brought in from other areas of the county. Where there are opportunities to try and ensure that benefits *trickle down* to local lower income areas and the unemployed (in proximity to the works), these should be taken. This could be through training or apprenticeship programmes which will create a longer term impact through the creation of careers and adaptable skills.

During interviews and on the Measuring Change questionnaire tenants stated that comfort was of importance, and a significant benefit of the works. Ensuring this benefit is “sold” to tenants ahead of retrofit works is key to ensuring buy-in and engagement with retrofit.

The upheaval and cost of reinstating houses to a habitable condition post retrofit should not be underplayed, and proper provision should be put in place to ensure that those on lower incomes do not

lose out disproportionately. This could be through means tested support, rather than one-size-fits-all payments.

The community cohesion effects are underreported in the analysis. This was mentioned during the interview stage but could not be monetised in the calculation. It was likely a significant factor, along with the support of the New Barracks Estate Co-operative TMO, in making the whole process tolerable for the tenants.

The approach adopted has also demonstrated the importance of gathering information on pre retrofit and post retrofit circumstances and engaging with stakeholders so that change can be documented and properly analysed. Learning from the project has also emphasised the need to ensure advice and guidance is available post retrofit to ensure residents understand the need to change behaviours and effectively use new technologies.

However, this study indicates that through New Barracks Estate low carbon retrofit a viable social investment has been made which has created a significantly higher value than the investment itself. It also proves that in social terms this has been a worthwhile investment.

In summary, the New Barracks Estate retrofit programme has been a demonstrable success in a number of areas which have been highlighted throughout this report and the supporting Measuring Change report. The retrofit has positively changed the lives of those on the estate and will continue to do so in the coming years.



## Appendix A

Health working to establish avoided costs to society

## Appendix A:

### Health working to establish avoided costs to society

Assumptions and information used to estimate health impacts associated with poor quality housing, winter cold and Fuel Poverty are outlined below:

- The Barker report<sup>23</sup> uses a median measure for Quality Adjusted Life Years<sup>24</sup> (QALY) as a measure of cost effectiveness of interventions and health outcomes. The report classes the types of injury that occur as a result of living in Fuel Poverty. These are as defined in the Housing and Health and Safety Rating System (HHSRS)<sup>25</sup>. There are four classes of injury:
  - Class 1 – resulting in death
  - Class 2 – severe harm (including cardio-respiratory disease, asthma, non-malignant respiratory disease)
  - Class 3 – serious harm (including hypertension, neurophysical and physiological impairment, increased accidents in the home)
  - Class 4 – moderate harm (including occasional severe discomfort, occasional pneumonia, regular serious cough or colds).
- The report used percentage figures predominantly from HHSRS<sup>26</sup> to estimate how many of each type of injury would result in a given population; this is then applied to Bolton. These percentages have been applied to the New Barracks Estate.
- Median values for QALYs were used (based on central government estimations) to estimate the impact on society for an avoided injury, the following values were used:
  - £50,000 for a Class 1 injury
  - £20,000 for a Class 2 injury
  - £1,500 for a Class 3 injury
  - £100 for a Class 4 injury.
- Morbidity refers to disease and injuries. In fuel impoverished households injuries and disease stem from
  - falls
  - damp and mould growth
  - impacts on mental health and well-being
  - cardiovascular or respiratory disease.
- As a proxy for Fuel Poverty, ONS statistics on benefit claimants for the neighbourhood where the New Barracks Estate is located were used<sup>27</sup>. This showed that 44% were claiming benefits, as such 44% of the population were assumed to be in Fuel Poverty<sup>28</sup>.
- For some types of injury the likelihood of occurring in such a small population (the New Barracks Estate) was negligible, as such they were not considered in the analysis. This approach was used for each morbidity category.

23 Barker, A. 2011. Assessment of the impact on health and health costs due to fuel poverty in Bolton. NHS Bolton

24 Quality Adjusted Life Years are used to assess the cost effectiveness of health interventions

25 HHSRS Guidance at <http://www.communities.gov.uk/publications/housing/housinghealth>

26 in the case of mental health and wellbeing the General Health Questionnaire is used

27 This is in-line with UK government practice: <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmenergy/424/42406.htm>

The ONS statistics can be viewed here:

<http://www.neighbourhood.statistics.gov.uk/dissemination/LeadTableView.do?a=7&b=276781&c=M5+3RX&e=4&g=353949&i=1001x1012x1013x1003x1004&j=290035&m=1&p=-1&q=1&r=0&s=1321354272000&enc=1&dsFamilyId=1623>

28 This broadly corresponds with the findings of Measuring Change where ~50% of respondents stated that before the works they either "always" or "sometimes" struggled to pay energy bills.

### Mortality

Data on excess winter deaths from a study on Greater Manchester Primary Care Trusts (Wasielewska et al (2010)<sup>29</sup>) was used. The data for Salford is shown below.

	Non-winter		Average non winter deaths	Winter deaths (Dec-Mar)	Excess winter deaths
	Deaths (Aug-Nov)	Deaths (Apr-Jul)			
2005/06	721	847	784	848	64
2006/07	741	744	743	866	124
2007/08	767	767	767	865	98
Annual average number of excess winter deaths in Salford:					95

Table 14 Data on non-winter and winter deaths in Salford

The table below shows further data used to arrive at the cost per year of excess winter deaths. The annual average number of winter deaths in Salford (95) was expressed as a proportion of the approximate number of people registered with Salford PCT. This was shown to be 0.04%.

Approximate number of people registered with Salford PCT	230,000
Proportion of excess deaths (from above average)	0.04%
Number of houses on New Barracks Estate	78
Estimated population based on 2.69 average house size (from Measuring Change)	209.82
Number of deaths one might expect in one year (ie. 0.04% of 209.82)	0.09
Number of years one might expect one death (include if within 20 year time period)	11.52

Table 15 Calculation of excess winter deaths

Over the 20 year assessment period 1.74 deaths might occur (20 divided by 11.52) as a result of the cold. It was assumed that these would be avoided, due to the New Barracks Estate low carbon retrofit. This was rounded up to two avoided deaths, and using the QALY amount per death outlined previously, a financial proxy of £100,000 avoided cost to society saved was used.

<sup>29</sup> Excess Winter Mortality in Greater Manchester A Summary of Recent Trends and Local Policy Responses, available at: <http://www.nwpho.net/nwpho/>

**Morbidity: falls**

The first type of injury incurred from Fuel Poverty according to the Barker report is falls. The methodology used to estimate cost to society first estimates the number of houses in Fuel Poverty in the Bolton area. From here it estimates the number of people who suffer falls within the Fuel Poverty subset. From this number, estimations of numbers of people suffering Class 1-4 injuries were calculated using proportions from the HHSRS.

No of households	78
No of properties on the estate in Fuel Poverty	34.32
The Bolton study states this proportion of houses in Fuel Poverty suffer falls	0.004
This means, on the New Barracks Estate, this many will suffer falls per year	0.14

Table 16 Number of falls per year on the New Barracks Estate

The Barker approach has been applied to the New Barracks Estate and an avoided cost to society based on the Class 1-4 QALY values, has been worked out. Only Class 4 injuries were likely to occur in the 20 year period.

	<b>Percentage of those in a given population, suffering injury (HRSRS)</b>	<b>Number of incidents on the New Barracks estate</b>	<b>Years for one injury to occur</b>	<b>Include?</b>	<b>QALY</b>
Class 1	1.90%	0.00	376.06	No	-
Class 2	6.70%	0.01	106.64	No	-
Class 3	21.70%	0.03	32.93	No	-
Class 4	69.70%	0.10	10.25	Yes	£9.75
<b>Total cost per year</b>					<b>£9.75</b>

Table 17 Avoided cost to society from preventing Fuel Poverty related falls

### Morbidity: Damp and mould growth

Injuries from damp and mould growth might include allergies and mild infections. Data from the Measuring Change survey was used to estimate those who previously suffered damp and mould. The percentage of people who stated that there was either a “big” or “some” improvement in damp or mould (on average 59%) was used to estimate for the number of households suffering from these problems.

No of households	78
From Measuring change: % of people who said there was “some” or a “big” improvement in damp and mould	59%
Number of houses	46

Table 18 Number of houses experiencing damp and mould

	Percentage of those in a given population, suffering injury (HRSRS)	Number of incidents on the New Barracks estate*	Years for one event to occur	Include?	QALY
Class 1			not applied		
Class2			not applied		
Class 3	0.02%	0.00	7169.99	No	-
Class 4	0.15%	0.07	14.14	Yes	£7.07
<b>Total cost per year</b>					<b>£7.07</b>

Table 19 Avoided cost to society from preventing damp and mould related health problems

### Morbidity: mental health and wellbeing

Effects on mental health and wellbeing include stress, depression and social isolation. The Barker study only applies this to people over 60. The Measuring Change results were used to estimate the number of people of pensionable age on the estate. From here, the number of people of pensionable age in Fuel Poverty was estimated. Finally the numbers of people at risk of Class 3 and Class 4 (Class 1 and 2 were not applied) mental health and wellbeing injuries were estimated.

The average household had 2.69 people, of which 18.6% were pensioners (Source: Measuring Change)	
No of households	78
No. of people (using average house size of 2.69)	210
No of OAPs (using average of 18.57%)	39
Of which, 44% are in Fuel Poverty	17
Of these, 36.8% will suffer mental health and wellbeing problems (Barker, 2011)	6

Table 20 estimating the number of people on the estate experiencing health and well-being problems on the estate

## Appendix A/ Health working to establish avoided costs to society

	<b>Percentage of those in a given population, suffering injury (Bolton General Health Questionnaire, 2010)</b>	<b>Number of incidents on the New Barracks estate*</b>	<b>Years for one event to occur</b>	<b>Include?</b>	<b>QALY</b>
Class 1			not applied		
Class2			not applied		
Class 3	14%	0.88	1.13	Yes	£1,324.89
Class 4	22.8%	1.44	0.70	Yes	£143.84
<b>Total cost per year</b>					<b>£1,468.73</b>

Table 21 Avoided cost to society from preventing mental health and wellbeing related health issues

### Morbidity: cardiovascular (CV) or respiratory disease (RD)

Barker estimated that 0.26% of households in Bolton suffered CV or RD as a result of excess cold. This figure was used for the New Barracks Estate.

No of households on the estate	78
Of which, 0.26% will suffer CV or RD (Barker states 66 households out of 25,258)	0.19

Table 22 Estimating the number of CV and RD related problems from Fuel Poverty on the New Barracks Estate

	<b>% of injuries for a population (from Barker study)</b>	<b>Number of incidents on the New Barracks estate</b>	<b>Years for one event to occur</b>	<b>Include?</b>	<b>QALY</b>
Class 1	not applied				
Class2	6.06%	0.01	80.96	No	-
Class 3	18.18%	0.04	26.99	No	-
Class 4	42.42%	0.09	11.57	Yes	£8.65
<b>Total cost per year</b>					<b>£8.65</b>

Table 23 Avoided cost to society from preventing CV/RD health and wellbeing related health issues



For further information contact:

[www.arup.com](http://www.arup.com)

**Alison Ball**  
T +44 (0)151 227 9397  
E [alison.ball@arup.com](mailto:alison.ball@arup.com)

**Matt Roberts**  
T +44 (0)161 779 8886  
E [matt.roberts@salixhomes.org](mailto:matt.roberts@salixhomes.org)

Document ref: Salix Homes Post Retrofit Evaluative SROI/ Front cover: Barracks Estate, Salford © Salix Homes

**ARUP**